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A Note regarding the Identification of a Snakeskin Belt in the American Civil War Museum, Richmond, Virginia

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On 11 December 1928 a belt, presumed by the donor to be alligator skin, was presented to the Arkansas Room of the Confederate Museum[1], which at the time was housed in the White House of the Confederacy, Richmond, Virginia (Figure 1). The belt was allegedly worn by a Confederate soldier from Arkansas and was presented to the museum from the collection of Col. S. A. Cunningham. The belt is 2 inches (50.8 mm) wide by 30 inches (762 mm) long, of brown leather covered in snakeskin (Figure 2), with a brass pattern 1851 U.S. eagle and silver wreath plate, and brass hardware (Figure 3). Stitching on the left side of the belt indicates that it was a sword belt (American Civil War Museum online database). Presently, the former Confederate Museum's collections, including the belt (catalog number 0985.01.00037), are in the collection of the American Civil War Museum in Richmond, Virginia[2]. Herein, I provide a summary of my examination of high-quality images of the belt which identify the skin as that of a snake.

Unlike the scalation on the belt, the skin of alligators is covered dorsally with eight transverse rows of nonoverlapping, relatively large keeled scutes, varying in diameter from 5 to 8 cm depending on the size of the animal and the anatomical location along the alligator's back (Brazaitis, 1989; Chen et al., 2013). Smaller, irregularly shaped scutes are present on the sides; ventrally there are numerous rows of large square-shaped scutes. The much smaller dorsal scales of snakes are imbricate and arranged in uniform rows around the body. In some snakes, such as rattlesnakes, the number of scale rows gradually decrease from behind the head to the tail (Klauber, 1972). For example, timber rattlesnakes usually have 25–27 scale rows anteriorly, 23 or 25 near midbody, and 19 just before the tail. The number of scale rows at various points of the body, the type (smooth or keeled) and shape of scales, and pattern can be useful characters in the identification of snakes and their skins (Fuchs and Fuchs, 2003; Gray, 2005).

Figure 2. Snakeskin-covered belt in the collection of American Civil War Museum, Richmond, Virginia.

There is no discernable pattern on the skin of the belt. This is likely due to the age of the skin, and possibly the process of preparing it for leather. The scales on the belt are elongated and drop-like with a median keel, and lack an apical notch. Some

Figure 1. The White House of the Confederacy—Confederate Museum, Richmond, Virginia, southwest view, circa 1896. Image courtesy of the American Civil War Museum, Richmond, Virginia.

Figure 3. Close-up image of 1851 U.S. eagle and silver wreath plate. Image courtesy of the American Civil War Museum, Richmond, Virginia.

1. Prior to the 1970s, the museum was housed in the former White House of the Confederacy. Each room in the house was dedicated to a different southern state, and donations were often made to specific State Rooms based on their history or donor's preference. In this case, the belt was given to the Arkansas Room, which was one of the smaller rooms—really a landing on the third floor of the house (Cathy Wright, Curator, the American Civil War Museum, personal communication).

2. Formed in 2013 with the consolidation of the American Civil War Center at Historic Tredegar and the Museum of the Confederacy, The American Civil War Museum is dedicated to exploring the American Civil War and its legacies from multiple perspectives: Union and Confederate, enslaved and free African Americans, soldiers and civilians. The museum comprises three sites: The White House of the Confederacy and Historic Tredegar, both in Richmond, and The Museum of the Confederacy–Appomattox <https://acwm.org/about-us/for-the-media/news-release/american-civil-war-museum-releases-updated-expansion-schedule>.

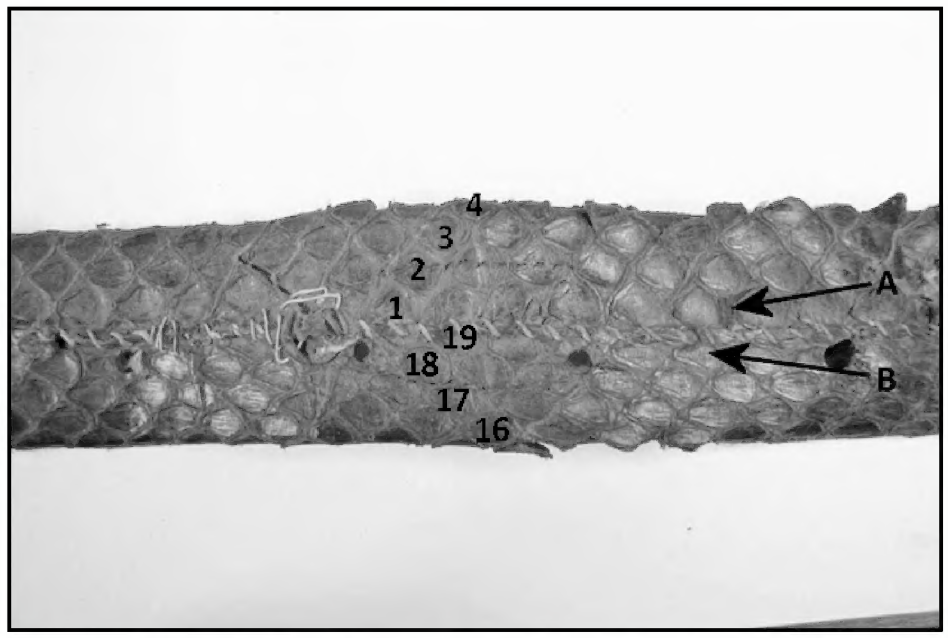

Figure 4. Method of counting scale rows. The count begins at the stitched mid-seam (rows 1–4) on the inner surface of the belt, continues around the outer surface of the belt with rows 5–15 (see Figure 5), then back around to the mid-seam (rows 16–19). Note that row 1 ("A" arrow) is wider than row 19 ("B" arrow). Image courtesy of the American Civil War Museum, Richmond, Virginia.

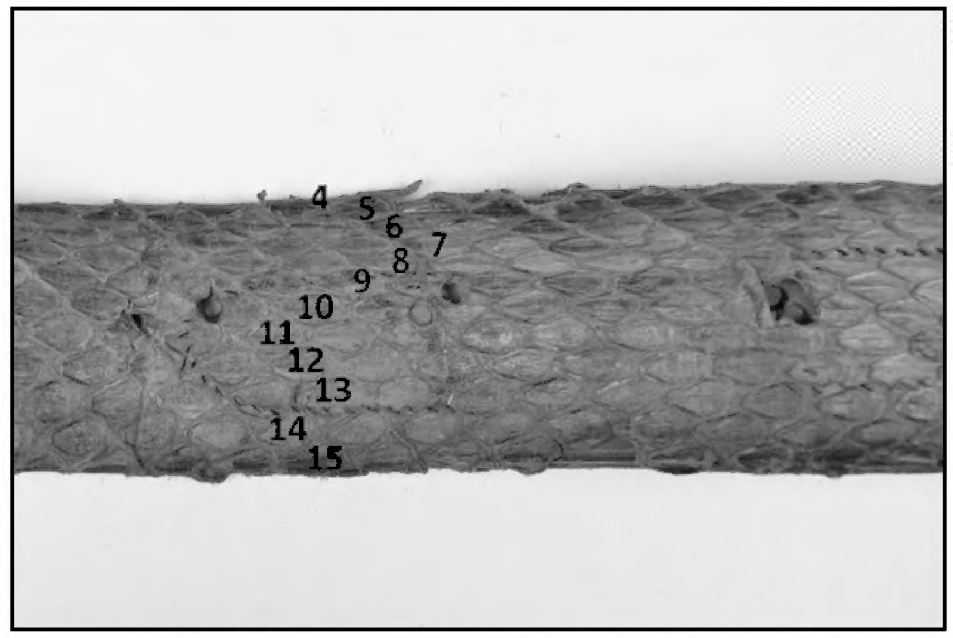

Figure 5. Method of counting scale rows continued. Outer surface of belt. Image courtesy of the American Civil War Museum, Richmond, Virginia.

scales appear smooth, likely due to the skin's age and from the process of preparing the skin. Counting scale rows around the belt from the stitched mid-seam, there are 19 scale rows (Figures 4 and 5). On the section of belt near the belt loop, 20–22 scale rows can be counted. In both cases, several scale rows are missing, including the ventral (i.e., belly) scales. Note that in Figure 4, the scales in row 1 (indicated by the A arrow) are much wider than those in row 19 (B arrow). In most snakes, including rattlesnakes, the dorsal scales gradually increase in width from the vertebral row (i.e., the scale row along the middle of the back) to the lowermost row on either side, above the ventral scales. In Figure 4, the scales indicated by the "A" arrow are characteristic of those in the lowermost row; however, because the ventral scales are missing, there is no way to determine this for certain. Considering the difference in the width of scales above and below the seam, it is reasonable to assume that there are at least 2–4 scale rows missing (not including the ventral scales). Therefore, the estimated number of dorsal scale rows at the section of belt illustrated in figures 4 and 5 would be 21–23; and 22–26 near the belt loop. Based on the dimensions of the belt buckle (ca. 50.8 × 76.2 mm), I estimate that the width of the intact snakeskin would have been approximately 153 mm wide. This estimate includes 25 mm for 4 missing scale rows, and 38 mm for the ventral scales, which can make up approximately 25% of the total skin width (Fuchs and Fuchs, 2003). In order to estimate the minimum total length of the intact snakeskin, I utilized the shed stratum corneum of three Western Diamond-backed Rattlesnakes, *Crotalus atrox*, and three Timber Rattlesnakes, *Crotalus horridus*. Average measurements were obtained for the head (80 mm) and tail (92 mm, not including the rattle) sections. These average values were then added to the length of the belt to estimate the minimum length of the intact snakeskin as being ca. 934 mm. The snake's head would have been located somewhere beyond the section with the belt loop; whereas the tail would have been beyond the section with the buckle.

Without a visible dorsal pattern and knowing where the actual snake came from, it is not possible to narrow the identification to species. If the maker of the belt acquired the snake from Arkansas, two species are of sufficient size to have provided a skin large enough to make the belt. These are the Timber Rattlesnake, *C. horridus* (Figure 6) and the Western Diamond-backed Rattlesnake, *C. atrox* (Figure 7). Presently, the former species is more widespread in Arkansas (Trauth et al., 2004), whether this was the case in Arkansas during the mid-1800s is uncertain. Martin (1982) suggests that *C. horridus* in the North-

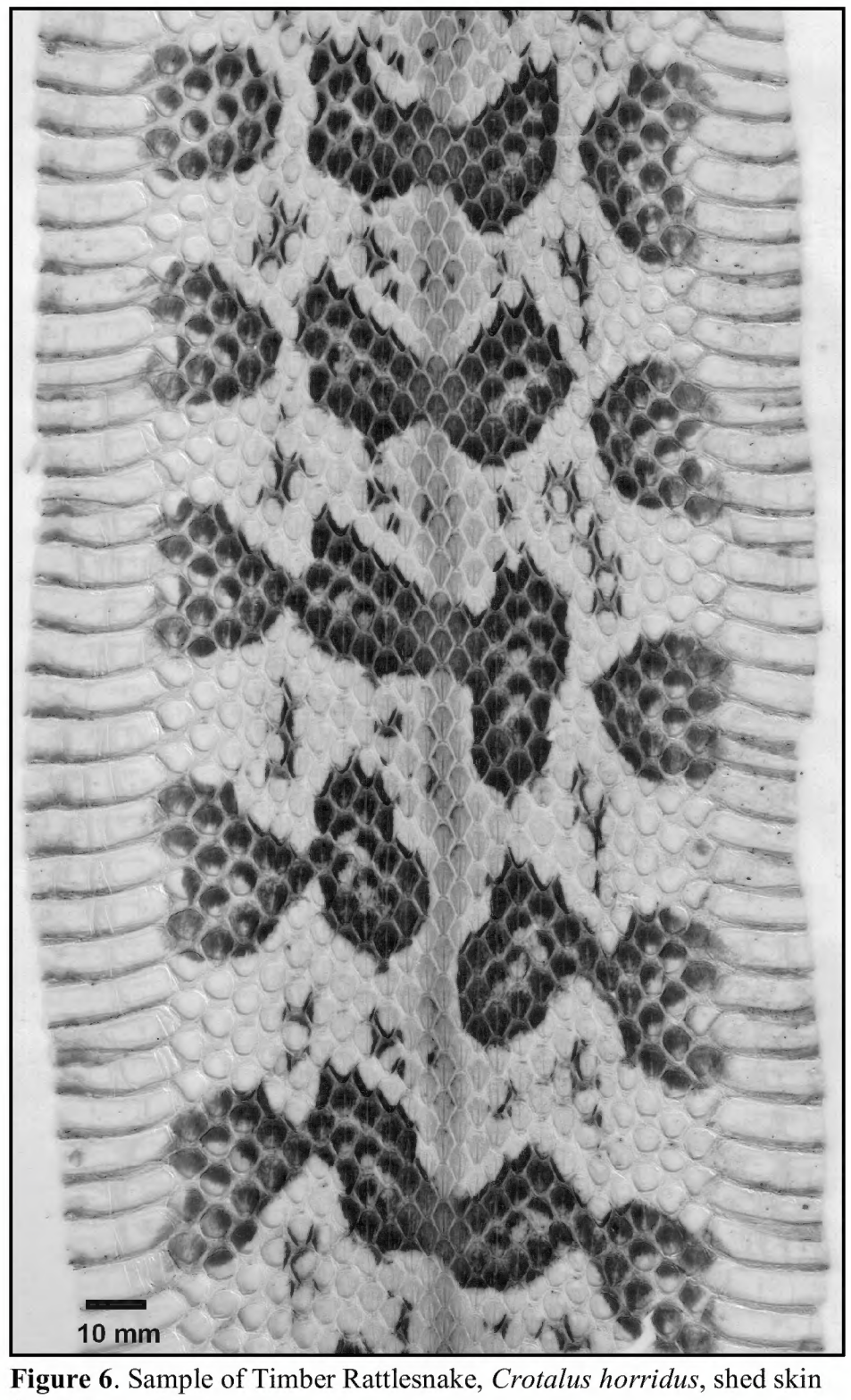

Figure 6. Sample of Timber Rattlesnake, *Crotalus horridus*, shed skin (stratum corneum).

east had a much wider distribution prior to European settlement. Utilization of additional techniques may clarify the identification to species. For example, near-infrared imaging and photography can be used to reveal original dorsal patterns on dyed snake leather products (Baker et al., 2012), and it is likely that this technique may be able to reveal an obscure pattern on the snakeskin belt. Additionally, since it is possible to extract mitochondrial DNA (mt DNA) from hides and leather (Vuissoz et al., 2007), perhaps this could be done with a sample from the snakeskin belt. In one study however, the tanning process likely caused DNA extraction and sequencing of crocodile leather products to be difficult, with only one in five skins being identifiable (Eaton et al., 2010).

In summary, the scale type (i.e., keeled and lacking an apical notch) and shape; estimated number of scale rows 23-26; the estimated size of the skin; collectively are indicative of a rattlesnake in the genus *Crotalus*.

Acknowledgments

I wish to offer my sincere thanks to Cathy Wright (Curator, the American Civil War Museum, Richmond, Virginia) for providing data and images regarding the snakeskin belt and its history described in this paper. Thanks also to Sean Hartzell for offering thoughtful comments that improved the manuscript.

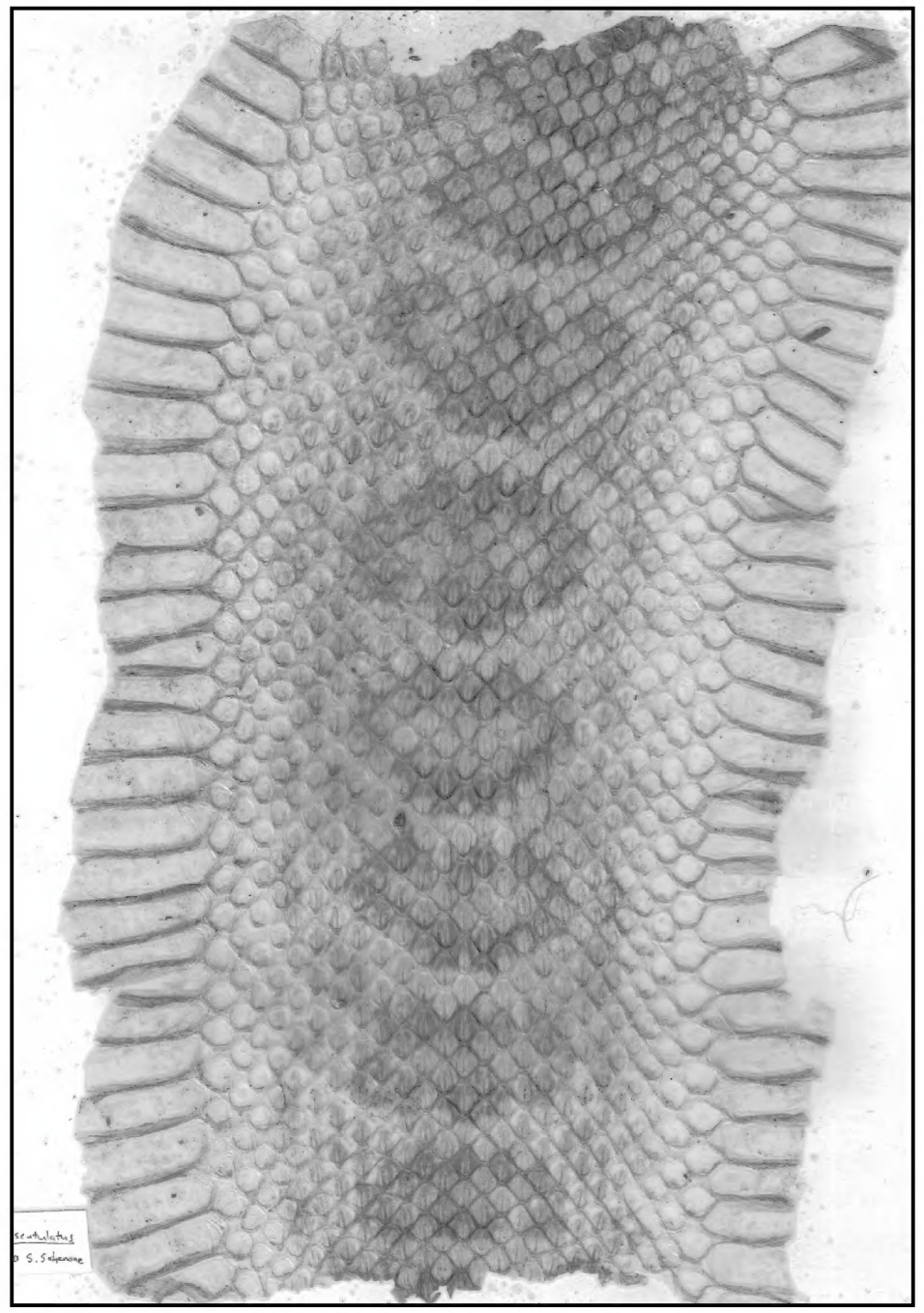

Figure 7. Sample of Western Diamond-backed Rattlesnake, *Crotalus atrox*, shed skin (stratum corneum).

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Dietary Notes on the Variable Coral Snake, *Micrurus diastema* (Duméril, Bibron & Duméril, 1854)

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The variable coral snake (*Micrurus diastema*) is distributed along the Atlantic versant from central Veracruz, Mexico, through the Yucatán Peninsula, Belize, and northern Guatemala to northwestern Honduras (Campbell and Lamar, 2004; Heimes, 2016). It preys primarily on small snakes, but lizards, caecilians and swamp eels have also been reported (Greene, 1973; Blaney and Blaney, 1978; Seib, 1985; Lee, 1996; Roze, 1996; Campbell, 1998; Rodriguez et al., 1998; Campbell and Lamar, 2004; Heimes, 2016; Köhler et al., 2016). We examined the stomach contents of *M. diastema* specimens from Mexico (n = 23) and Guatemala (n = 1) within the University of Illinois Museum of Natural History Herpetology Collection (UIMNH). Prey items found in the gastrointestinal tracts of three *Micrurus diastema diastema* specimens are reported herein. Prey remains were compared with conspecific representatives from the UIMNH collection to confirm identifications.

UIMNH 19193 (♀; SVL = 421 mm; Total Length = 458 mm) was collected in August of 1936 by Edward H. Taylor in Cuautlapan, Veracruz, Mexico (18.877°N, -97.023°W, WGS 84; ca. 1000 m elev.). The remains of a *Geophis semidoliatus* were found in the lower gastrointestinal tract of this snake and identified by presence of smooth scales with alternating black bands (four scales thick) and a unicolored venter (Figures 1 and 2). The elevation also suggests *G. semidoliatus* over the similarly marked *G. lorancai* (Canseco-Márquez et al., 2016; Heimes, 2016). Three unidentified snake eggs were also found in the upper gastrointestinal tract, ingested after the *G. semidoliatus*.

UIMNH 19194 (♂; SVL = 457 mm; Total Length = 531 mm) was collected on 15 July 1935 by Henry D. Thomas in Córdoba, Veracruz, Mexico (18.884°N, -96.926°W, WGS 84). We identified a partially digested *Chersodromus liebmanni* (undigested posterior length = 146 mm) in the specimen's stomach based on the following characters: slate-black striated dorsal scales in 17 rows at midbody, a first scale row visibly wider than others, and dorsal coloration extending onto the edge of the ventrals (Figures 1 and 2).

UIMNH 48822 (♂?; SVL= 478 mm; Total Length = 559 mm) was collected between 1939 and 1940 by Dyfrig McHattie Forbes from [central] Veracruz, Mexico (locality unspecified). Two small snakes, one entire and one anteriorly digested, were found in its gastrointestinal tract. Both snakes were identified as *Ninia sebae* based on the following characteristics: strongly keeled black-tipped dorsal scales in 19 midbody rows, immaculate venter, and a light nuchal collar followed by a black nuchal saddle (Figures 1 and 2). The entire *N. sebae* (♀ with four eggs; SVL = 247 mm) measured 298 mm in total length and the remains of the anteriorly digested *N. sebae* measured 139 mm.

The data herein mark the first record of *Chersodromus liebmanni* and snake eggs in the diet of *M. diastema* as well as the first instance of natural predation on *Geophis semidoliatus*. Previously published observations are also presented and include additional data regarding the instances of predation, geographic area, *M. diastema* subspecies, and any associated specimens (Table 1). Instances of predation, or predation events, were drawn from the original references based on the number of unrestricted individuals consumed. The eggs presented herein are considered a single instance of predation because they appeared to be from the same clutch. We assigned subspecific identities for UIMNH *M. diastema* specimens using morphological characters presented in Roze (1996). For literature records, subspecific status was

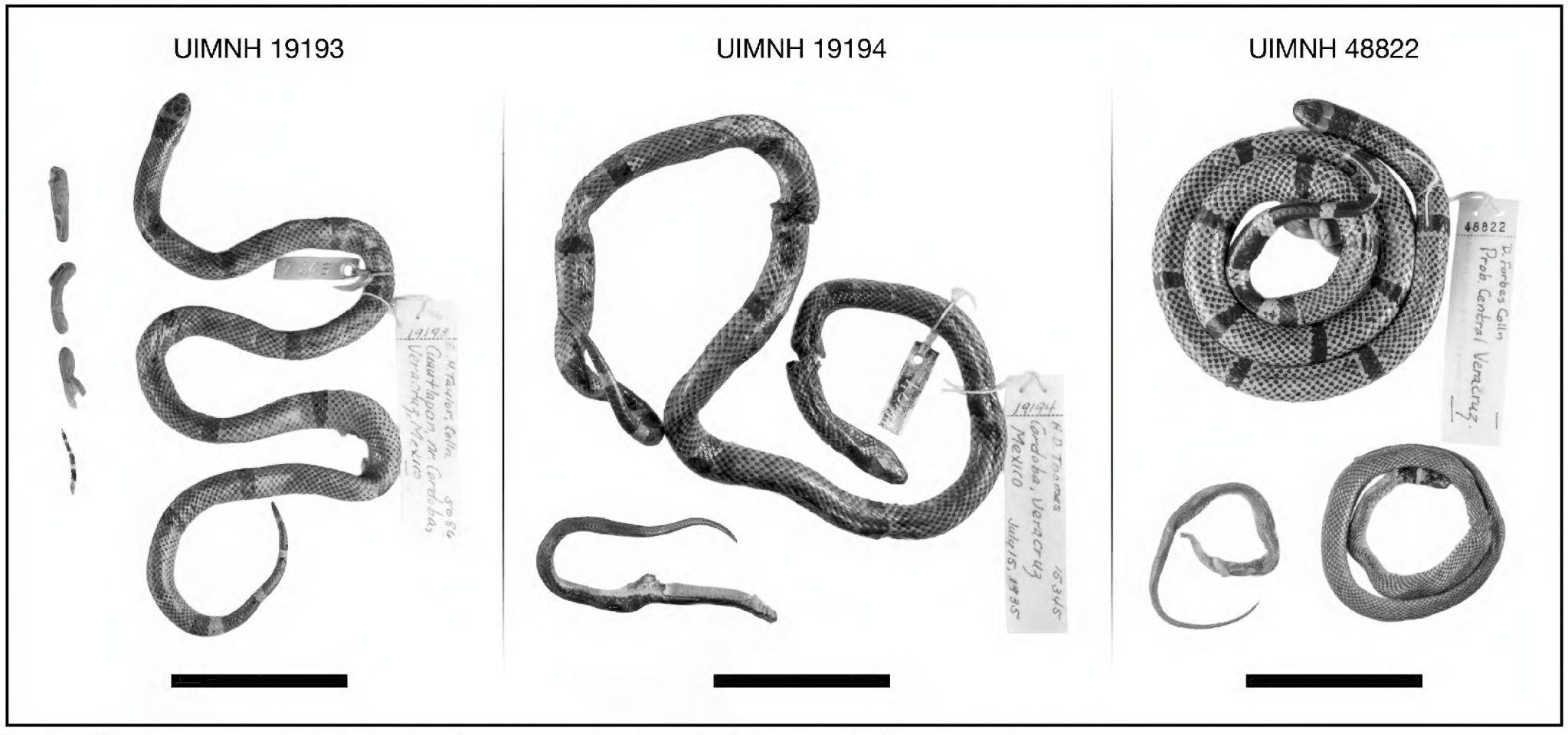

Figure 1. *Micrurus diastema* specimens with their stomach contents. Scale bars are equal to 5 centimeters.

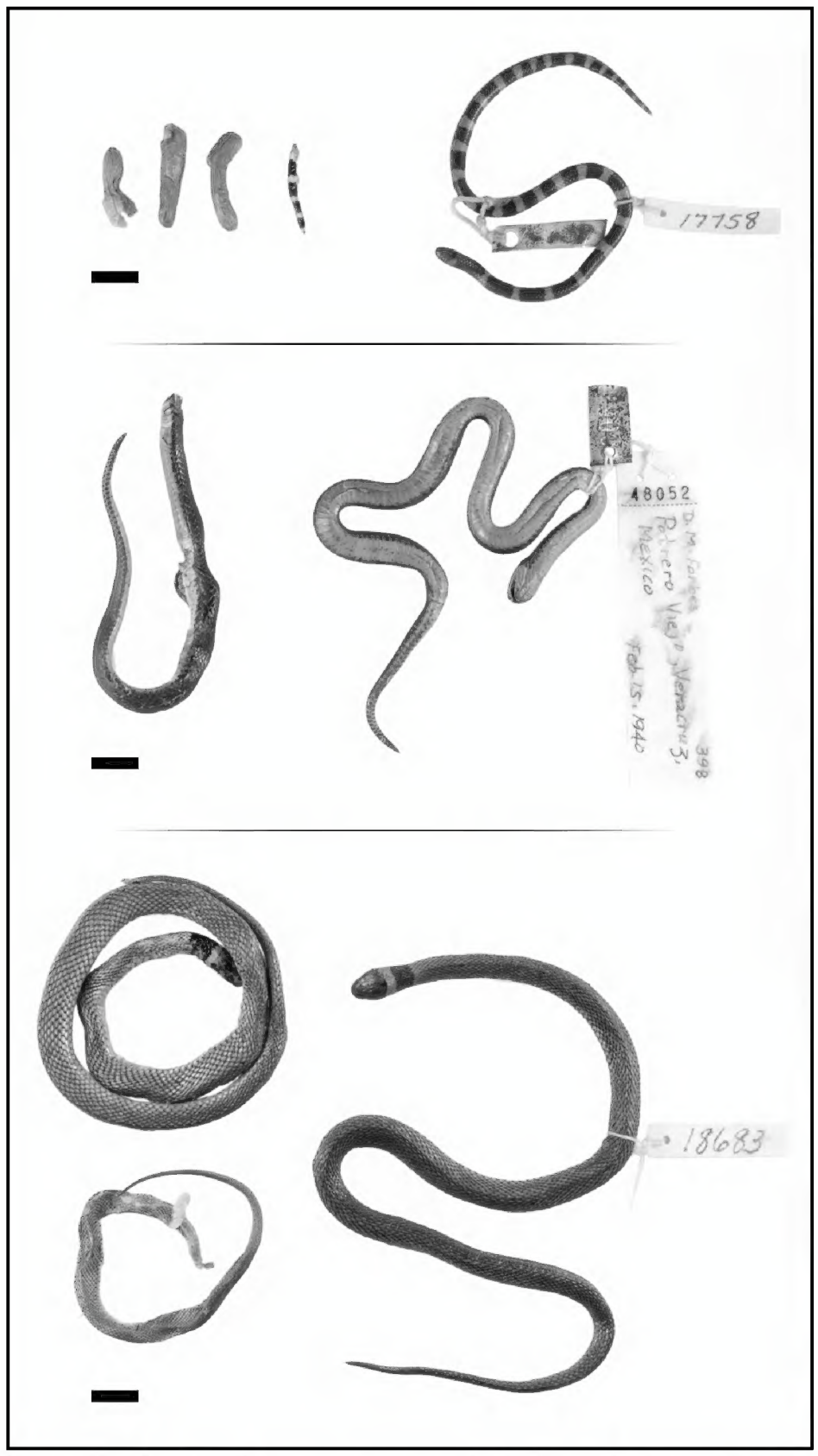

Figure 2. *Micrurus diastema* prey items (left) alongside conspecific representatives from the UIMNH Herpetology Collection (right). Scale bars = 1 cm.

assigned using the map presented in Campbell and Lamar (2004), which features large intergradation zones in regions of doubt. Associated specimens were taken directly from the literature, while we presented ambiguous mentions to specimen lots in the Appendix and left unspecified information blank.

We additionally discovered several dubious diet records in the literature. One *M. diastema* specimen, UCM 40082, examined by Greene (1973) had ingested four *Geophis sallei*. However, the specimen was collected in southern Oaxaca and actually represents *Micrurus browni*. Accordingly, *Geophis sallei* has been removed from the prey list of *M. diastema*. The *Tantilla* spp., *Epictia goudotii* and *Indotyphlops braminus* listed in the diet of *M. diastema* by Campbell and Lamar (2004) are erroneously attributed to Roze (1996), who did not mention these prey items for *M. diastema*. Campbell and Lamar (2004) attributed these same prey items to *M. browni*, suggesting a likely mistake. With the origin of these prey items questionable, we have chosen not to include them in our dietary assessment, but cautiously include them in our comprehensive prey list (Table 1) as a possible personal observation by Campbell or Lamar.

We assessed the relative importance of each taxon in the diet of *M. diastema* using the reported instances of predation for each prey item (Table 2) and assumed prey items referenced in the literature without an occurrence record to be single instances. Over 90% of the reported *M. diastema* diet consists of reptiles, with 86% of the total diet represented by snakes spanning 21 species from three families, the most important being small terrestrial snakes, especially cryptozoic dipsadines. By far, the most commonly preyed upon species by *M. diastema* is the red coffee snake (*Ninia sebae*), a co-distributed mimic that was consumed throughout the geographic range of *M. diastema*. No distinct geographic patterns in diet are discernable other than a gradual latitudinal shift from a completely snake-based diet to the north to one comprising lizards and other non-reptilian elongate prey further south.

Acknowledgments

The authors would like to acknowledge Henry D. Thomas, Dyfrig McH. Forbes, and Edward H. Taylor for collecting the specimens and contributing information to the natural history of *Micrurus diastema*.

Table 1. Comprehensive prey list for *Micrurus diastema* with taxonomic updates. Observations from captive settings are denoted with an asterisk (*) and those questionable in origin with a question mark (?). Museum codes: ECO-CH-H = El Colegio de la Frontera Sur (ECOSUR), Unidad Chetumal, Quintana Roo, Mexico; LSUMZ = Louisiana Museum of Natural History, Baton Rouge, Louisiana, USA; SMF = Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt, Germany; UCM = University of Colorado Museum of Natural History, Boulder, Colorado, USA; UIMNH = University of Illinois Museum of Natural History, Urbana, Illinois, USA.

Subspecies	Reference(s)	Prey / Instances	Location	Associated Specimen(s)
alienus	Lee, 1996	*Amerotyphlops microstomus* / 1	Quintana Roo, Mexico	
	Lee, 1996	*Coniophanes* sp. / 1	Yucatán, Mexico	
	Greene, 1973	*Amerotyphlops microstomus* / 3	NE Yucatán Peninsula	
	Greene, 1973	*Ficimia publia* / 2	NE Yucatán Peninsula	
	Greene, 1973	*Holcosus undulatus* / 2	NE Yucatán Peninsula	
	Greene, 1973	*Ninia sebae* / 6	NE Yucatán Peninsula	
	Greene, 1973	*Pseudelaphe phaescens* / 1	NE Yucatán Peninsula	
	Greene, 1973	*Sibon sanniolus* / 11	NE Yucatán Peninsula	

Table 1 (cont'd).

Subspecies	Reference(s)	Prey / Instances	Location	Associated Specimen(s)
alienus	Greene, 1973	*Stenorrhina freminvillei* / 4	NE Yucatán Peninsula	
	Greene, 1973	*Tantillita canula* / 2	NE Yucatán Peninsula	
alienus × *sapperi*	Blaney and Blaney, 1978	*Mesoscincus schwartzei* / 2	Quintana Roo, Mexico	LSUMZ 33359
	Köhler et al., 2016	Class: Chilopoda / 1	Quintana Roo, Mexico	
	Köhler et al., 2016	*Ficimia publia* / 1	Quintana Roo, Mexico	SMF 100564, 101253
	Köhler et al., 2016	*Micrurus diastema* / 1	Quintana Roo, Mexico	SMF 99635, 99636
	Köhler et al., 2016	*Ninia sebae* / 1	Quintana Roo, Mexico	
	Köhler et al., 2016	*Ophisternon infernale* / 1	Quintana Roo, Mexico	ECO-CH-H 3194
sapperi	Lee, 1996	*Tropidodipsas sartorii* / 2	Campeche, Mexico	
	Roze, 1996	*Ninia sebae*	S Yucatán Peninsula	
	Roze, 1996	*Tropidodipsas sartorii*	S Yucatán Peninsula	
apiatus × *sapperi*	Campbell, 1998	*Amerotyphlops microstomus*	Guatemala	
	Campbell, 1998	*Coniophanes fissidens*	Guatemala	
	Campbell, 1998	*Dendrophidion vinitor*	Guatemala	
	Campbell, 1998	*Gymnopis syntrema*	Guatemala	
	Campbell, 1998	*Scincella cherriei*	Guatemala	
	Campbell, 1998	*Synbranchus marmoratus*	Guatemala	
	Campbell, 1998	*Tropidodipsas sartorii*	Guatemala	
	Greene, 1973	*Adelphicos sargii* / 2	Guatemala	
	Greene, 1973	*Geophis carinosus* / 1	Guatemala	
	Greene, 1973	*Ninia diademata* / 1	Guatemala	
	Greene, 1973	*Ninia sebae* / 4	Guatemala	
	Greene, 1973	*Stenorrhina degenhardtii* / 1	Guatemala	
apiatus	Roze, 1996	*Lepidophyma flavimaculatum*	Guatemala	
	Roze, 1996	Order: Gymnophiona	Guatemala	
	Seib, 1985	*Micrurus diastema* / 1	Guatemala	
	Seib, 1985	*Ninia sebae* / 4	Guatemala	
	Seib, 1985	*Stenorrhina degenhardtii* / 1	Guatemala	
diastema	Roze, 1996	*Geophis* sp.	Veracruz, Mexico	
	Roze, 1996	*Ninia* sp.	Veracruz, Mexico	
	This study	*Chersodromus liebmanni* / 1	Veracruz, Mexico	UIMNH 48822
	This study	*Geophis semidoliatus* / 1	Veracruz, Mexico	UIMNH 19193
	This study	*Ninia sebae* / 2	Veracruz, Mexico	UIMNH 19194
	This study	Serpentes (eggs) / 1	Veracruz, Mexico	
diastema × *affinis*	Heimes, 2016	*Ninia sebae* / 1	Veracruz, Mexico	Heimes, 2016 (Fig. 391)
	Rodriguez-Garcia et al., 1998	* *Geophis semidoliatus*	Veracruz, Mexico	
	Rodriguez-Garcia et al., 1998	* *Ninia diademata*	Veracruz, Mexico	
	Rodriguez-Garcia et al., 1998	* *Ninia sebae*	Veracruz, Mexico	
	Rodriguez-Garcia et al., 1998	* *Tropidodipsas sartorii*	Veracruz, Mexico	
macdougalli	Greene, 1973	*Coniophanes imperialis* / 1	Oaxaca, Mexico	UCM 49376
	Campbell and Lamar, 2004	? *Epictia goudotii*		
	Campbell and Lamar, 2004	? *Indotyphlops braminus*		
	Campbell and Lamar, 2004	? *Tantilla* spp.		

Table 2. Dietary assessment of *Micrurus diastema* based on the frequency of predation upon different taxonomic entities.

Prey Items	**Occurrences**	
Reptilia	**Total: 74**	**93.67%**
Squamata: Serpentes *86.07%*	Total: 68	
Unknown (eggs)	1	
Colubridae (Colubrinae)		
Dendrophidion vinitor (Barred Forest Racer)	1	
Ficimia publia (Blotched Hooknose Snake)	3	
Pseudelaphe phaescens (Yucatan Rat Snake)	1	
Stenorrhina degenhardtii (Degenhardt's Scorpion-eater)	2	
Stenorrhina freminvillei (Freminville's Scorpion-eater)	4	
Tantillita canula (Yucatecan Dwarf Short-tailed Snake)	2	
Colubridae (Dipsadinae)		
Adelphicos sargii (Sargi's Earth Snake)	2	
Chersodromus liebmanni (Liebmann's Earth Runner)	1	
Coniophanes spp. (Black-striped Snakes)	1	
Coniophanes fissidens (Yellow-bellied Snake)	1	
Coniophanes imperialis (Regal Black-striped Snake)	1	
Geophis spp. (Earth Snakes)	3	
Geophis carinosus (Keeled Earth Snake)	1	
Geophis semidoliatus (Broken-ringed Earth Snake)	1	
Ninia spp. (Coffee Snakes)	1	
Ninia diademata (Ring-necked Coffee Snake)	1	
Ninia sebae (Red Coffee Snake)	19	
Sibon sanniolus (Pigmy Snail-sucker)	11	
Tropidodipsas sartorii (Terrestrial Snail-eater)	4	
Elapidae		
Micrurus diastema (Variable Coral Snake)	2	
Typhlopidae		
Amerotyphlops microstomus (Yucatecan Worm Snake)	5	
Squamata: Lacertilia *7.59%*	Total: 6	
Scincidae		
Mesoscincus schwartzei (Schwartze's Skink)	2	
Scincella cherriei (Brown Forest Skink)	1	
Teiidae		
Holcosus undulatus (Rainbow Ameiva)	2	
Xantusiidae		
Lepidophyma flavimaculatum (Yellow-spotted Night Lizard)	1	
Amphibia	**Total: 2**	**2.53%**
Gymnophiona	Total: 2	
Dermophiidae		
Gymnopis syntrema (Mountain Caecilian)	1	
Actinopterygii	**Total: 2**	**2.53%**
Synbranchiformes	Total: 2	
Synbranchidae		
Synbranchus marmoratus (Marbled Swamp Eel)	1	
Ophisternon infernale (Blind Swamp Eel)	1	
Chilopoda	**Total: 1**	**1.27%**
Centipedes	Total: 1	
	Total: 79	**100%**

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Appendix

Micrurus diastema specimens examined from the University of Illinois Museum of Natural History Herpetology Collection (UIMNH), Champaign, Illinois, USA.

MEXICO—Chiapas: 87715. Tobasco: 87714. Oaxaca: 35629–35632, 37320–37322, 37330. Veracruz: 19193–19196, 27570, 34925, 34926, 48046–48049, 48822, 51353.
GUATEMALA—El Petén: 52526.
Subspecies—*diastema*: 19193–19196, 27570, 34925, 34926, 48046–48049, 48822. cf. *diastema* × *macdougalli*: 37330.
cf. *affinis* × *sapperi*: 51353. *sapperi*: 52526. cf. *macdougalli* × *sapperi*: 87714, 87715. *macdougalli*: 35629–35632, 37320–37322.

Micrurus diastema specimens examined by Greene (1973).

MEXICO—Oaxaca: UCM 49376, UCM 40082 (= *Micrurus browni*).
GUATEMALA—UCM 23169, 23170, 34291, 34292; CM uncatalogued (n = 9).

Micrurus diastema specimens examined by Blaney and Blaney (1978).

MEXICO—Quintana Roo: LSUMZ 33359–33362.

Micrurus diastema specimens examined by Seib (1985).

GUATEMALA (or vicinity)—CAS, MVZ, and UMMZ collections.

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Notes on Reproduction of Hurter's Spadefoot Toads, *Scaphiopus hurterii* (Anura: Scaphiopodidae), from Oklahoma

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Abstract

I conducted a histological examination of gonads from 43 adult *Scaphiopus hurterii* collected in Oklahoma. Reproduction in Oklahoma *Scaphiopus hurterii* occurred from February to September. The smallest mature male (sperm in lumina of seminiferous tubules) measured 48 mm SVL. The smallest mature female (in spawning condition) measured 55 mm SVL. Postovulatory follicles (evidence of a recent spawning) are reported for the first time in *S. hurterii.*

Scaphiopus hurterii Strecker, 1910, occurs in eastern Oklahoma, southwest Arkansas, western Louisiana to south Texas (Frost, 2018). Bragg (1944a) gave information on the geographic distribution of *S. hurterii* in Oklahoma where it reproduces in temporary pools (Bragg, 1944b). *Scaphiopus hurterii* breeding is stimulated by large amounts of rainfall (Bragg, 1945). In Louisiana, *S. hurterii* breed explosively during and following heavy rains (Dorcas and Gibbons, 2008). The behavior of *S. hurterii* larvae is detailed in Black (1973). In this paper, I present data from a histological examination of *S. hurterii* gonadal material from Oklahoma. Utilization of museum collections for obtaining reproductive data avoids removing additional animals from the wild.

A sample of 50 *S. hurterii* collected 1929 to 2014 in Oklahoma consisting of 33 adult males (mean snout–vent length, SVL = 60.0 mm ± 5.0 SD, range = 48–67 mm), 10 adult females (mean SVL = 60.1 mm ± 5.0 SD, range = 55–73 mm), seven unsexed subadults (mean SVL = 40.0 mm ± 4.0 SD, range = 34–44 mm) was examined from the Sam Noble Oklahoma Museum (OMNH), University of Oklahoma, Norman, Oklahoma, USA (Appendix). An unpaired *t*-test was used to test for differences between adult male and female SVLs (Instat, vers. 3.0b, Graphpad Software, San Diego, CA).

A small incision was made in the lower part of the abdomen and the left testis was removed from males and a piece of the left ovary from females. Gonads were embedded in paraffin. Sections were cut at 5 μm and stained with Harris hematoxylin followed by eosin counterstain (Presnell and Schreibman, 1997). Histology slides were deposited at OMNH.

There was no significant difference between mean SVLs of adult males versus adult females of *S. hurterii* ($t = 0.04$, df = 41, $P = 0.97$). The testicular morphology of *S. hurterii* is similar to that of other anurans as described in Ogielska and Bartmańska (2009a). Within the seminiferous tubules, spermiogenesis occurs in cysts which are closed until the late spermatid stage is reached; cysts then open and differentiating sperm reach the lumina of the seminiferous tubules (Ogielska and Bartmańska, 2009a). There are two stages in the testicular cycle of *S. hurterii* (Table 1): Stage 1 "Sperm present"—sperm cysts have opened and clusters of sperm are present in the lumina of the seminiferous tubules. A ring of germinal cysts is located on the inner periphery of each seminiferous tubule in some of the *S. hurterii* males. Stage 2 "No sperm present"—no sperm present in lumina of the seminiferous tubules. The presence of 73% stage 2 (no sperm present) in males from my September sample indicates that the *S. hurterii* testicular cycle was nearing conclusion. Absence of male samples from July and August did not permit a complete description of monthly changes in the testicular cycle. However, it is likely that some *S. hurterii* testes from these two months would have contained small (residual) quantities of sperm. The smallest mature male *S. hurterii* (sperm present) in my sample measured 48 mm SVL (OMNH 9887) and was from February. Adult *S. hurterii* males measure 43–73 mm SVL (Wright and Wright, 1949).

The ovarian morphology of *S. hurterii* is similar to that of other anurans in being paired organs situated on the ventral sides of the kidneys; in adults ovaries are filled with diplotene oocytes in various stages of development (Ogielska and Bartmańska, 2009b). Mature oocytes are filled with yolk droplets; the layer of surrounding follicular cells is thinly stretched. Two stages were present in the spawning cycle (Table 2): Stage 1 "Ready to spawn"—in which mature oocytes predominate; Stage 2 "Not in spawning condition"—in which early diplotene oocytes predominate. The absence of female *S. hurterii* samples from May, July and August did not allow a complete description of monthly stages in the ovarian cycle. Nevertheless, my data indicate spawning is underway in March and continues into September (Table 2). One female from April (OMNH 38141) and one from June (OMNH 13439) (Table 2) each contained postovulatory follicles, indicating a recent spawning (*sensu* Redshaw, 1972). Postovulatory follicles form when the ruptured follicle collapses after ovulation; the follicular lumen disappears and proliferating granulosa cells are surrounded by a fibrous capsule (Redshaw, 1972). Postovulatory follicles are short-lived in most anuran species and are resorbed after a few weeks (Red-

Table 1. Two monthly stages in the testicular cycle of 33 adult male *Scaphiopus hurterii* from Oklahoma.

Month	N	Sperm present (Stage 1)	No sperm present (Stage 2)
February	1	1	0
March	2	2	0
April	17	17	0
June	2	2	0
September	11	3	8

Table 2. Two monthly stages in the spawning cycle of 10 adult female *Scaphiopus hurterii* from Oklahoma; * = postovulatory follicles present.

Month	N	Ready to spawn (Stage 1)	Not in spawning condition (Stage 2)
March	1	1	0
April	4	3	1*
June	3	2	1*
September	2	2	0

shaw, 1972). The smallest mature *S. hurterii* female (ready to spawn) measured 55 mm SVL (OMNH 38140) and was from June. Adult *S. hurterii* females measure 44–82 mm SVL (Wright and Wright, 1949).

Varying amounts of atresia were noted in all *S. hurterii* females (Table 2) 10/10 (100%). Atresia is a widespread process occurring in the ovaries of all vertebrates (Uribe Aranzábal, 2009). It is the spontaneous digestion of a diplotene oocyte by its own hypertrophied and phagocytic granulosa cells which invade the follicle, and eventually degenerate after accumulating dark pigment (Ogielska and Bartmańska, 2009b). It is common in the amphibian ovary (Saidapur, 1978). See Saidapur and Nadkarni (1973) for a description of the stages of follicular atresia in the frog ovary.

Regarding my sample of seven unsexed juveniles, the two smallest (SVLs = 34, 35 mm), were collected in May, all others (SVLs = 38–44 mm) were from June. Presumably some of the larger individuals would have reached maturity in about a year.

Table 3. Months of breeding by state for *Scaphiopus huerterii*.

State	Times of breeding	Source
Arkansas	March to June	Trauth et al., 1990
Louisiana	February through July	Boundy and Carr, 2017
Oklahoma	April to September	Bragg and Smith, 1942
Oklahoma	April and May	Black, 1973
Oklahoma	April through June	Sievert and Sievert, 2011
Texas	January to December	Wright and Wright, 1949
Texas	March to September	Tipton et al., 2012

Months of breeding for *S. hurterii* by state are listed in Table 3. My findings of one male from February undergoing spermiogenesis is one month earlier than reported for *S. hurterii* reproduction in Texas (March to September) by Tipton et al. (2012). In contrast to the congener *Scaphiopus couchii* in which activity and reproduction coincides with the summer monsoon (Goldberg, 2018), *S. hurterii* has a longer period in which breeding may occur. According to Bragg (1945) spadefoot toads in Oklahoma have no definite breeding season; reproduction can occur any time from early spring to mid-September under suitable environmental conditions.

Acknowledgments

I thank Cameron D. Siler (OMNH) for permission to examine *S. hurterii* and Jessa L. Watters (OMNH) for facilitating this loan.

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Appendix

Fifty *Scaphiopus hurterii* examined by county from Oklahoma borrowed from the herpetology collection of the Sam Noble Museum (OMNH), University of Oklahoma, Norman, Oklahoma, USA.

Atoka: OMNH 39108–39110, **Bryan:** OMNH 9887; **Cherokee:** OMNH 42536; **Cleveland:** OMNH 13438, 13439, 32878–32880, 38139–38143, 42004–42006, 42535, **Hughes:** OMNH 22257, 22258, 30252, 30253, 38144–38155; **Lane:** OMNH 39107; **Marshall:** OMNH 43847–43850: **Muskogee:** OMNH 39625–39629; **Pittsburgh:** OMNH 22259–22263.

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Book Review: *Peterson Field Guide to Western Reptiles and Amphibians, Fourth Edition* by Robert C. Stebbins and Samuel M. McGinnis 2018. 560 pp. Houghton Mifflin Harcourt Publishing Company. ISBN: 978-1-328-71550-0 Softbound $24.99 ($16.37 through Amazon.com)

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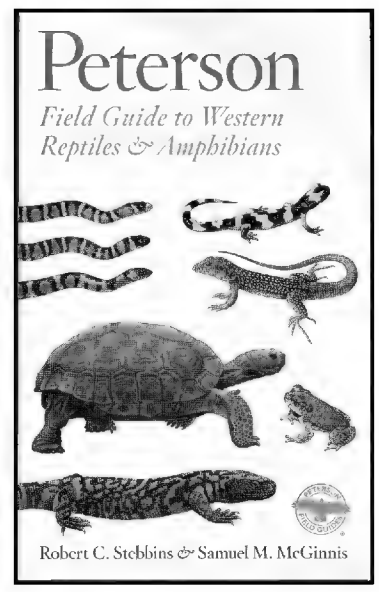
This fall, I rendezvoused with Mike Dloogatch and other longtime members of the Chicago Herpetological Society at Snake Road in southernmost Illinois. Soon after exchanging pleasantries, Mike asked if I would be interested in reviewing the recently-published 4th edition of the *Peterson Field Guide to Western Reptiles and Amphibians* (hereafter referred to as the Western Guide or Stebbins and McGinnis). Having never lived out west or spent much time there, I hesitated to consent. Surely there must be a more informed individual better suited for the job. The following morning, when Mike and John Archer came to collect me for another day in the field, Mike handed me the book and my fate as reviewer was sealed. How could I say no to someone who has given so much to the Society and has provided so many helpful editorial comments to me over the years?



Resting amid a long line of field guides on one of my bookshelves is the first edition of Robert C. Stebbins's Western Guide, published in 1966. Having spent almost no time out west I have rarely opened the book; it is in excellent condition. Perhaps, someday, I'll make a westward pilgrimage and put the new edition to work. But first, I need to give it an in-depth look.

Robert Stebbins produced three editions of his field guide, the first in 1966, the second in 1985, and the third in 2003. He received much-deserved accolades for his artistic talents and attention to detail revealed in the first three editions (<https://en.Wikipedia.org/wiki/Robert_C._Stebbins>, accessed October 2018). Dr. Stebbins passed away in 2013, after a long and productive career, at the age of 98. Samuel M. McGinnis, with whom Dr. Stebbins collaborated to write *Field Guide to Amphibians and Reptiles of California*, stepped in to revise the current edition of the Western Guide. In the acknowledgments section of this edition, Dr. McGinnis implores the reader to acknowledge "the lifelong work and dedication to the field of herpetology of Robert C. Stebbins." He also explains that as a result of decades of association with Stebbins he uses the pronoun "we" instead of "I" because their "shared thoughts and outlooks" are presented in the current edition.

To provide you, the reader, with the best possible review of the newest edition of the Western Guide, I have spent considerable time reading select portions of the text, evaluating photographs and maps, and comparing—where appropriate—the 4th edition with the 1st edition and with the 4th edition of the *Peterson Field Guide to Reptiles and Amphibians of Eastern and Central North America* (hereafter referred to as the Eastern Guide or Powell et al.).

The 4th edition of the Western Guide comprises 560 pages—nearly double the size of the 1st edition. The latest edition of the Western Guide is organized much like the 4th edition of the Eastern Guide; introductory text is followed by sections arranged taxonomically, with amphibians preceding reptiles. Text and color plates for major taxonomic groups (orders, in most cases) are differentiated by color-coded page margins (e.g., red for turtles, purple for lizards). Different colors also delineate sections pertaining to Baja California endemics and amphibian eggs and larvae. Unlike previous editions, range maps are now in color and scattered throughout the book, typically in close proximity to the relevant species account. In the interest of saving space, these new maps are small (less than 2 × 2 inches) and geographically limited in scope. For example, all maps terminate abruptly near the 100th meridian. For species that range further east, the reader is left wondering how far east. In the original edition of the Western Guide, many maps for species that ranged east extended all the way to the Atlantic Ocean. Now one must consult the Eastern Guide to determine the eastern range extent of these species.

Generally, the color maps work well, although the color yellow can be difficult to discern. This is particularly apparent in the case of the Northern Leopard Frog. In addition to a large swath of contiguously occupied territory, Northern Leopard Frog occurrence is also spotty, particularly in California. The tiny yellow spots representing isolated populations are barely discernable without magnification or holding the book at an angle to catch the right light, similar to tilting a check to see the watermark. I do like the use of pale blue and a cross to indicate the portion(s) of a species' range from which it has been extirpated. These maps send a strong conservation message to the reader, especially in cases such as the Sierra Nevada Yellow-legged Frog which has disappeared from approximately 95% of its historical range.

The introductory text—which should be read by every owner of the Western Guide—details *important* information such as how the authors intended the book to be used, the geographic coverage of the book, measurements used when describing the size of each taxon (snout–vent length for amphibians and lizards, shell length for turtles, and total length for snakes), how to interpret the range maps, how and where to find amphibians and reptiles, how to perform field studies, what can be done to conserve herpetofauna, and how the authors interpreted modern taxonomic relationships. These days, taxonomic relationships seem to be re-interpreted on a daily basis, with former subspe-

cies being elevated to the level of species and newly-described cryptic species being derived from a previously-recognized single species. Stebbins and McGinnis address this head-on in sections entitled, "Subspecies" and "New Species, Genera, and Families." Although the authors generally follow the Society for the Study of Amphibians and Reptiles 2012 standard name list, they sometimes use their own judgement. They note that other biologists may not "have made precisely the same taxonomic decisions." Further, they note that "personal opinion and judgment will probably dominate" taxonomic decisions "for some time to come."

The taxonomic decisions reached by Stebbins and McGinnis sometimes result in interesting comparisons for species that are addressed in both the 4th edition of the Western Guide and the 4th edition of the Eastern Guide. For example, Stebbins and McGinnis retain the name *Lampropeltis getula* for Common Kingsnakes in the west, applying subspecific status to Desert Kingsnakes (*Lampropeltis getula splendida*). Powell et al., on the other hand, follow a recommendation to elevate Desert Kingsnakes to full species status (*Lampropeltis splendida*) and restrict the use of "*getula*" principally to kingsnakes inhabiting states comprising the eastern seaboard. In another example, Stebbins and McGinnis recognize *Sceloporus undulatus* as part of the western herpetofauna and identify seven subspecies inhabiting the region. According to the taxonomic arrangement followed by Powell et al., *Sceloporus undulatus* is replaced by *Sceloporus consobrinus* west of the Mississippi River. Situations like these can place field biologists in the uncomfortable position of having to choose which name to apply to the animal at hand. I implore any taxonomists reading this review to please come to some agreement amongst your selves so we field biologists don't have to agonize over which name to use.

Stebbins and McGinnis suggest an alternate approach to the "capture" of amphibians and reptiles. Instead of physical capture of an animal, they encourage digital "capture" using a camera or smartphone. I especially appreciate the authors' statement that turned cover objects should be returned to their original position. I also like their suggestion that readers consider taking notes in a journal to keep track of their observations. Memory can be unreliable, so careful note-taking can provide an accurate accounting of the day's observations. Further, field notes can yield data worth sharing with the scientific community. A full three pages of text are devoted to protection and conservation of herpetofauna. Topics such as environmental laws, introduced species (e.g., African Clawed Frog, American Bullfrog), and climate change are discussed. Conservation of Nature was very important to Dr. Stebbins as revealed in his 2009 book, *Connecting with Nature: A Naturalist's Perspective*. Clearly, amphibians and reptiles, and the habitats upon which they depend, are in need of human stewardship if they are to survive the Anthropocene.

In addition to sections common to both the Western Guide and the Eastern Guide, the Western Guide also includes sections devoted to identification keys, Baja California endemics, and amphibian eggs and larvae. I find the inclusion of dichotomous keys, including those to identify amphibian eggs and larvae, particularly appealing. Oftentimes, amphibian eggs and larvae are more readily available to the field biologist than are amphibian adults. The drawings of eggs and larvae are excellent. While going through the salamander key, I discovered a significant error (page 31). Option 1A (lungless salamanders) is intended to take the reader to couplet 3 where lungless salamanders are further subdivided, and option 1B is intended to direct the reader to other salamanders. Regrettably, in the 4th edition of the guide, option 1A sends the reader to couplet 2 which includes the newts and the mole, giant and torrent salamanders, and option 1B sends the reader to the lungless salamanders. This error was not present in any of the previous editions of the Western Guide.

The general format of each species account follows previous editions by providing common and scientific name, federal and state protective status (where applicable), length (inches and centimeters), physical description highlighting unique identifying characteristics, and the following sections: Similar Species, Habitat, and Range. In some accounts, additional subsections are included such as Young (how to identify young animals), Male and/or Female (how to differentiate the sexes), Voice (description of anuran vocalizations), Subspecies (where applicable), and Remarks (topics include taxonomy, conservation, and hybridization). In addition to written descriptions of anuran calls, the authors introduce the reader to anuran-call CDs by Carlos Davidson in the Voice section of the introduction.

In his revision of the 4th edition of the Eastern Guide, Dr. Powell laments the deletion of much of Roger Conant's original text devoted to the natural history of each species. Happily, this is not the case with the 4th edition of the Western Guide. For example, the Western Tiger Salamander account extends over slightly more than 1.5 pages. The in-depth natural history and conservation information renders the Western Guide more useful than just as a means of identifying an animal at hand. Like the Eastern Guide, the 4th edition of the Western Guide includes color photographs of animals scattered throughout the book. Although the majority of these photographs are high quality, several are too dark (e.g., Speckled Black Salamander on page 95) or too blurry (e.g., Arboreal Salamander on page 97) to be of much use.

Odd as it may sound, there appears to be some confusion over order of authorship. The publisher lists Stebbins as first author on the book cover, but logs McGinnis as first author on the title page. Further, the Library of Congress catalogs the order of authorship as McGinnis and Stebbins (<https://catalog.loc.gov>, accessed December 2018). Given that Robert Stebbins wrote the first three editions of the book by himself, retaining his name as first author seems most appropriate.

Other than relatively minor issues, I am impressed by the quality of the Western Guide and encourage anyone living out west to add this book to their collection. Dr. McGinnis did an outstanding job updating the 4th edition of the Western Guide thereby providing an important resource for the next generation of western herpetologists. In doing so he honors the memory of his mentor, Robert C. Stebbins.

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Lions and Tigers and Bobcats—Oh My!

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In recent columns, this author has ranted about charging bulls and stinging bees. The fact is, the stinging bees are *way* scarier than anything else one can encounter here in Arizona. But there is good reason to fear many other things. Perhaps this author has, at times, led the reader to believe that he is fearless. The truth is, I dress in such fashion that the blazing yellow stripe running down my backbone is never visible. No, it's not that I'm fearless—it's just that I like herping enough to rise above my constant state of terror in order to perform the deed. And getting older has done nothing to improve any would-be bravado. Nor has it helped my memory any. When one ages, one gets redundant. Not only that, one starts to repeat oneself a lot!

This particular column began with me describing the most dangerous mountain lion experience I have ever had. As the volume of words started to appear, so eventually did the title. It started as "Lions and Tigers and Bears, Oh My." But then, a little spark of warning entered my brain—like maybe I had seen or heard that someplace before? Deep feats of thinking ensued. Nope! The title is as clean as a hound dog's tooth. And what a catchy title it is—glad I thought of it! As soon as the title was deemed to be original, I continued to peck away at this keyboard to recreate the memory of Gery Herrmann and his son Ben joining me on a local nocturnal herp jaunt. At one point, we had one pissed off lion who was yowling away at us, and it actually got so close to me that it brushed right past me in a mock charge. (*Man* did that ever happen fast! It happened so fast that I wasn't even sure what it was that had just rushed me). The more detail that was added to the saga, the more I began to think "I've told this one before." Even though I write for people who mostly don't read what is written, I would *hate* to start telling the same stories twice. What if one of my readers *was* actually reading these things, and even more amazingly, remembering what I said? (Scary!). Punching in the title after I was 2,000 words deep into this amazing encounter, (in an area that is now heavily signed with warnings about the dangers of mountain lions—which are all over the place there), put the inkling in my feeble brain that I had told this story before. On top of that, I might have been stealing this title of mine from someone. Who could that be? Eventually, the thought process led me to an old file folder that contains hard copies all of my past ravings. I came across the Bulletin of the CHS Volume 35, Number 11, November 2000. There is a picture of an ugly guy leaning against the flanks of a 30 foot long *atrox* on the cover—for those of you who keep your *Bulletin*s in paper format. Or, if you want to see it, you *could* go to the CHS Website, find the *Bulletin* link <http://www.chicagoherp.org/bulletin/35(11).pdf>, and snag it that way. Thanks to the efforts of our editor and John Palis the list of choices is staggering, but highly organized. Anyway, that particular lion story is told there, and the title I might be stealing was created by Steve Barten. But *his* title was "Lions and Tigers and Monsters, Oh My!" For a brief while, we were good to go with my highly original title, since it wasn't an *exact* rip-off of anybody. Except that now, there is no longer anything about bears in this piece. The bears went away when article length became a factor. I had two great bear stories to relate, but the desire to stay below 10,000 words with this column was very strong. (It is my sincere hope that readers are aware of the fact that there is a *lot* of thought that goes into a title). With bears no longer in the column, had the title remained unchanged, surely some smartass would have piped up with "Lions and Tigers and Bears, Oh My—peh! Where are the bears?" The answer "currently in first place in the NFL Central" would have been good for a couple yucks, but would *not* have justified an errant title. Go Bears!

And then, as if to further erode my brilliant idea for a catchy title for this column, I had already told the lion story. On top of that, I also wanted to include bobcats in this piece. Fortunately, I have five more lion encounters that could be discussed. Four of these I remember vividly; I only say five because four doesn't sound like enough. Hence, armed with more lion material, and a strong desire to include bobcats, the title became what it is today. I will speak of only two of these lion encounters, and save the rest for other, less active column days. Maybe I can lump them with the bears? Jeez! That can never happen! Lions are in last place, Bears are in first. The two don't even belong in the same sentence!

The first lion story is short and sweet. I was driving a favored back road just before sunset, when at a distance of about 50 meters, I saw a large adult lion crossing in front of me. I raced to get to it, and got to his crossing spot just as he reached the other side of the road. He paused, his body aiming away from me, but his head had swiveled backward to look right at me. His amber-colored irises and Apache-teardrop pupils stared straight into my bloodshot gaze. He was on the passenger side of my Tot coma. I cranked my window down to get a better look at him, and fumbled for my camera. He looked the other way, and slowly ambled off and out of sight. The whole observation lasted perhaps 30 seconds, and no, I never got a photo. I was too busy gawking to take the picture. I don't know what it is about me constantly judging an animal by the size of its balls—is it an inherent character flaw? Am I a ballophile? But truth be told, the balls on this cat were *much* bigger than my own—and this was back when I had a pair. This cat *had* to weigh close to 200 pounds. It was a *dandy*, and glad I am I was inside my truck while admiring the view.

From May through June of 2001, I had a lot of company from a big cat. I never actually saw her, I just heard her. I heard her often. At the time, I was in the early stages of radio-tracking *Crotalus atrox* and *Heloderma suspectum* in the Suizo Mountains of Pinal County, Arizona. High temperatures and the response of herp activity to the same had forced me to do most of my tracking at night. And in those days, I was almost *always* alone! I don't know how many of you have worked after dark, alone, in remote settings, but it ain't for the faint of heart. I thought nothing of it, *until* the yowling started. I was never the

same after that. On the first night it happened, I was merrily following the static and blips of my receiver to whatever bliss was at the end of it all. Suddenly, above and behind me, came an ear splitting "Buuurrrr-YEOWL-R-R-R-R-r-r-r . . . " I swung my head to the left, looking in the direction the sound came from, and it happened again! "Buuurrrr-YEOWL-R-R-R-R-r-r-r . . . " With that, I switched the receiver off, and anxiously awaited the next one, in order to see if it was getting closer. Nothing! Dead silence. With a shrug, I turned the receiver back on, and as soon as I did: "Buuurrrr-YEOWL-R-R-R-R-r-r-r . . . " again! Once again, I turned the receiver off. Nothing! Dead silence. On went the receiver again, and well, you don't know need to see any more of these "Buuurrrr-YEOWL-R-R-R-R-r-r-r . . . s" to know that is *exactly* what happened. There was a mountain lion nearby—one that was strenuously objecting to the noise that my receiver was making. I shut everything down and carefully made my way back to my truck. There was *nothing* in my contract that said *anything* about radio-tracking with a mountain lion hot on my ass.

That next morning, I asked my coworker friend Ron Harris, to bring his 9 mm automatic Glock pistol in to work to loan me. When he heard why I wanted it, he was more than enthused to let me borrow it. As one who hunts a lot, Ron told me that mountain lions are often known as "the other white meat" in the circles he hangs with. He was hopeful that the lion would attack, and that somehow I'd keep from blowing my own head off and kill it in the process. I sarcastically told him: "Yeah, Ron! By all means, set the table. There's a big kitty coming your way for supper. Count on it!" The sarcasm failed miserably, for as enthused as he was for his other white meat fiesta, he was quite concerned about the legal aspect of me killing a big kitty and bringing it to him. I said something along the lines of "WTF?" (Resplendent with the foo foo word). "Are you saying I can't legally shoot a lion that is attacking me? I have a hunting license, you know?" "Not good enough," came his response. But he went on to explain that there was some really good news in this nonsense. Since I already had a hunting license, for an extra dollar, I could buy a stamp that *allows* me to legally kill an attacking lion. What a bargain! For a mere buck, I get to fight back! How cool is *that*? And what if I *didn't* do this preposterous thing? What if I kept my buck, and took my chances? Would I draw a dotted line across my throat and tell the kitty: "Bite me here, please? I wish I had spent my buck, but sadly, I didn't, so now you get to eat me!" I told Ron to quit screwing around with legalities, give me the effing pistol, and if I scored me a big cat, I would hide the body for long enough to get that stamp if it became necessary. Jeez!

A *very* different Roger Repp stepped into the wilds of Arizona during the next tracking session. There was still enough daylight left for me to step out of my truck, point my pistol at Iron Mine Hill, and yell "Do you see *this*, big kitty? I want you to remember something. An armed society is a polite society! You got that? You'd better be nice to me—or else." **Ka-BLAM!** *Whoops*! In my enthusiasm, I accidentally slammed a hollow-point round into the side of the hill. The bullet hit an angled boulder in such fashion that it came whistling back straight at me. It carved a furrow in the dirt, stopping inches from my right foot. When I picked it up to investigate it, I discovered what was meant by the term "hot lead." Yehaw—that *burned*! It was at that point that a basic lesson in gun safety was learned. If one squeezes the trigger, a loaded gun will respond violently. I kept my finger off the trigger for all the future proclamations that followed—and there were many. I suddenly morphed into an NRA-loving, second amendment thumper of the Constitution of the United States of America! I found myself shouting "When guns are outlawed, only outlaws will have guns." I boldly waved that pistol in the air, demonstrating it to the little chirpy birdies in the trees, and the dragonflies on the wing. I found myself hollering thunderously into the serene surroundings: "You can have this gun when you pry it from my cold, dead fingers." I eventually holstered the weapon. As soon as it was out of my hand, things calmed down, and I began to love the Kennedys, Bill Clinton and Al Gore again. Everything was threaded up receiver wise, and off went this peace-loving Democrat to perform his mission for the love of climate change theories and the natural sciences. I'm happy to report that I never pulled the pistol from its holster again.

Needless to say, a short while after dark, the cat began its yowling again. Once again, it seemed to take objection to the noise the receiver was making. Only now, instead of turning the volume down, I cranked it louder, and shouted great obscenities back at the loudmouth. "Here kitty, kitty. I've got a nice surprise for you-know-who-oooo!" For the next four weeks, the verbal exchanges between man and beast continued. The cat was telling me in no uncertain terms that it didn't like me, and I was responding in classic redneck fashion to "come and get me!" The cat always remained on the upper south saddle of Iron Mine Hill. Three of our *atrox* and two of our Gila Monsters were occupying the turf below its bivouac. I'm extremely grateful that the animals I was tracking did not head in its direction. (This because I was stupidly determined to go where my subjects led me, come hell, high water, or large and nasty felines). The fact that this cat always seemed to be in the same place led me to believe that it was a female with kittens. She seemed to be objecting to me being close to her young, and there was definitely something to that receiver being a bother to her. The cat yowls eventually went away, as did the pistol. The lightening of the load around my waist was a relief, and my pants mostly stayed in their proper, upright position. While carrying that pistol, my plumber's crack was perennially on display for nature to behold. This in turn revealed a portion of that annoying bright yellow stripe running down my spine, which blinded all manner of wildlife. What the butt crack didn't offend, the yellow stripe did!

Shifting gears from mountain lions to bobcats may seem like a step down in the fear factor sense. There was a time when the thought of a face-to-face encounter with a bobcat seemed laughable to this author. But through the years, there have been several credible, nationwide accounts of bobcats attacking people. In a well-published account of an attack in Connecticut, three people *and* a dog wound up being hospitalized! At a state park here in Tucson, a jogger had one chase her down, merrily claw its way up the back of her bare legs, and do some serious damage to her back. The woman survived, but had to endure some painful, deep-scratch wounds, and a long hike out. There was also the mandatory series of rabies shots that always follow such an event as well. Ouch! A bobcat attack is not an experience to be taken lightly. They have been known to take down adult deer.

Figure 1. The author considers these three bobcat cubs to be the best personal find he has ever made in the field. They were found while seeking tortoises, in a tortoise-like shelter site. Image by Fred Wilson, 4 May 1991.

And even the biggest rattlesnakes are no match for them. While I have never been blessed to personally witness a rattler versus a bobcat contest, I have seen two different videos that show how adept the cats are at dispatching their limbless opponents. The cats strike faster with their claws than the snakes can retaliate. The snakes tire quickly, and are dispatched by a fierce bite to the neck. Nothing to it!

While my personal number one reason for any excursion into the wilds is *always* herpetologically based, finding a predatory mammal is considered a huge bonus. The most delightful personal find to ever pass before my eyes occurred on 4 May 1991. I was with a group of seven other people who were seeking and moving tortoises from land slated for development by a local mining concern. On this day, I headed up a steep incline that led to what I thought was a likely-looking burrow. One can only imagine my great surprise when three bobcat kittens were discovered inside the burrow. (Figure 1). As the other folk involved with this effort trickled over to check it out, they all said the same thing: "We better be careful, their mother may attack us." Each time this was said, I scoffed, and said something on the order of "bring her on!" Knowing what I *now* know about bobcats, I can say with some degree of confidence that my alligator mouth could have easily gotten in the way of my hummingbird ass here. This experience is mentioned for three reasons. The first is to brag about finding the kittens, the second is to get the resulting image published, and the third reason is to suggest that bobcats birthing in May is *not* wild speculation.

The morning of 9 May 2015 found me on a solo jaunt to Iron Mine Hill. I arrived at our beloved parking spot at 0816, and started the data sheet for the day in customary fashion. The opening temperature was a delightful 16°C. It promised to be a cool and pleasant morning for radio-tracking. I had seven snakes on my docket for the morning. Four of these were Black-tailed Rattlesnakes (*Crotalus molossus*), and three were Tiger Rattlesnakes (*Crotalus tigris*). I always tried to work the animals in such fashion as to get those situated lower on the hill first, and work my way up to those that were on high. The last thing in the world one wants to do is gain elevation for one, drop down low for the next, and head back up again for the next. I would often spend at least ten minutes to double check each location before proceeding. Years of experience had taught me how to avoid a process I called "whitewashing the hill." Slow and steady elevation gains are far superior to erratic up and down hiking, especially when one is an aging fat man. Man and signal were as one this morning. The snake closest to me, and lowest on the hill, was *Crotalus molossus* #14, or "Cm14" for short. He was found and photographed with the anterior third of his body draped outside a rather tight horizontal crevice. His ventral scutes rested on a bench-like rock structure that was beneath and adjacent to the crevice. An overhanging boulder provided deep shade for him.

The next closest snake was determined to be a female tiger, *Crotalus tigris* #12, or Ct12. We had named this snake "Ellie," after Marty Feldner's mother. As none of you will remember, this author wrote a column entitled "Steven and Ellie" that described a long term and consistent relationship between a male and female *C. tigris*. Of the 20 or so tigers we radio-tracked through the years, Ellie was my favorite. She was a healthy prime of life female, her markings were remarkable shades of orange, and her hunting skills were extraordinary. There is much more that could be relayed about Ellie, but we will save such elucidation for other columns.

Upon determining that Ellie was next on the list, I began to sweep along the lower base of a long stretch of boulders situated on the lower south side of the hill. The soil at the base of this stretch of boulders is loose and highly arable. The boulders range in size from large watermelons to wheelbarrow-sized to the size of Volkswagen Beetles, and are in places stacked in jumbles on and around each other. The softer soil at their bases allows for a healthy crop of palo verde and mesquite trees, not to mention an abundance of such shrubbery as ocotillo, hackberry, wolfberry, limberbush, and too many other plants to enumerate here. The lush canopy of the mesquite and palo verde towering above these boulders provides ample shade over all. Interwoven around and under these boulders are dense stacks of packrat detritus, and some of the openings under the larger boulders are rather cavernous. Ellie's signal indicated that she was above and beyond this patch of outstanding biological soup. I was seeking a break in the boulders so that I could easily go through and up. Off to my left, I discovered a stretch of flat bedrock that angled upward. It was an easy path through the boulders, and I was poised to head up it. But just beyond that slab, on the same contour, a bobcat emerged from out of one of the more cavernous boulder openings, came straight at me for a distance of about five meters, and veered to its right to head up that same slab that I was about to veer left to ascend. At the time she went up the slab, the distance that separated the two of us was about three meters. The gait of the cat was not rapid, and I had plenty of time to observe her rear haunches as she headed directly uphill in front me. For once, I was not staring at a pair of balls, but rather, some long and rather bedraggled-looking mammary glands that swung freely between her legs. I instantly surmised I was watching a post-parturition female bobcat who was moving slowly away from me. She continued up the slab for a distance of about ten meters, swung around the right side of a 1.5-meter-tall by perhaps 2-meter-diameter prickly pear cactus, and once safely behind it, she turned to face me. By this time, I had shed my backpack, carefully placed my antenna and walking staff on

Figure 2. The first stand of the bobcat encountered on 9 May 2015. The author speculates that this cat had recently given birth, which accounted for some aberrant reactions to his presence. Image by the author.

Figure 3. 9 May 2015. The cat moves *toward* the author, and begins to vocalize in a *most* disturbing and menacing fashion. Note the subtle upturn of the upper lips in this image, which was taken in mid-snarl. Her growling was "exactly like that of our ill-tempered pet cat, named Tama." Image by the author

the ground, and slowly and methodically removed my camera from its pouch. I began to ease forward, taking slow and deliberate images with every measured footstep. When I was roughly five meters away from the cat, I took the image seen in Figure 2. While it was tempting to move even closer to her, I did not. I was expecting her to bolt, but rather than turning to flee, she advanced *toward* me, slipping into the center of that prickly pear in front of where she made her first stand. As she began to enter the prickly pear, coming my way, she began to vocalize. My write-up of the event, 2½ hours later, describes this otherworldly vocalization as being exactly like that of our ill-tempered pet cat named "Tama." Tama would make this combination of low, sustained and prolonged growling that ended several octaves higher than what it started with. Tama would do this wicked bit just before attacking, scratching, and biting. And now, this bobcat was doing the same thing, only louder and more sustained. It is nearly impossible to put into words what this combination of a growl and high pitched, tapering meow sounded like, but "like something demon possessed" is not out of line. She crouched low on her haunches, so that she could watch me through a natural opening in the cluster of branches that surrounded her. And she continued making these god-awful sounds. Figure 3 shows the situation nicely. After squeezing off several more images, I began to slowly back away. Once I had stepped back about three paces, I slowly turned to look over my shoulder behind me. My first intent was to slowly back up until I got to the hole that she had first emerged from. I wanted to look into that hole in order to see if there were any kittens inside. I took one more step toward her original place of egress, still looking over my shoulder. When I turned again to see what the cat was doing, I was greatly surprised to see that she now stood on open ground, approximately a meter away from me. She was standing upright on all four legs, head held erect, which was about knee high to me. Knowing that my own nasty pet cat Tama weighed 17 pounds gave me the basis to guess that this bobcat was easily twice that. I'm guessing her weight to be around 35 pounds. Her growling had ceased at this point. She was staring up at me, and her expression was completely neutral. She was wide-eyed and alert, and if I could read anything at all in her expression, it was one of simple curiosity. She almost looked friendly. Almost! I was highly tempted to try some photos of her standing there within spitting distance of me, but was afraid to take my eyes off her for long enough to try it. I took one step backward. She took one step forward. This process continued for the next three backward steps I made. It was me taking a step back, her taking a step forward. She insisted on maintaining that distance between us. I still had this foolish notion that I wanted to look into the place that she had emerged from. Once I reached the contour below the boulders, at the downslope side of the bedrock passage, I took one sideways step to my right. As soon as I did, she immediately began that demon possessed growling of hers again. It was clear that she was ready to defend that hole, and I got wise. I veered away, and she did not come closer, instead moving toward where I can only assume her young were hiding. We began to part ways. I slowly picked up my pack, antenna, and walking staff, and began angling downslope, away from her. She took position in front of that hole, and sat tall on her haunches. She was watching my every move from there. I eventually worked my way to about 30 meters below her. I took a few more distant shots of her, which was a waste of effort. A bee suddenly passed by my face, and I waved it away. The rapid movement of my hand snapped my kitty friend back to full alert again. She stood up taller on her haunches, and just sort of glowered at me. I then continued to circle away from her, and thankfully, she did not follow.

The radio-tracking resumed, with many backward glances in the process. Indeed, it did appear that my kitty woes were behind me. It seemed she was only interested in protecting her brood with the incident just described, and I was no longer deemed a threat. Ellie's signal led me to a flat, shale-like slab that I instantly recognized as a place that her tiger buddy Steven had used before. This shale slab was roughly 70 mm thick by 80 cm wide by 1.2 m long in a south to north direction. As my data sheet suggests, the slab looked exactly like the state of Indiana. On this day, Ellie was roughly 50 meters north and upslope of the bobcat's nest. Tucked just under the southern, or downslope edge of the slab, Ellie lay loosely sprawled in a most unusual posture (Figure 4). The distal portion of her body was extremely

Figure 4. 9 May 2015. *Crotalus tigris* #12, Ellie, as she appeared the same day as Figures 2 and 3. She was roughly 50 meters northeast of the Bobcat. Note the distal plumpness that abruptly ends at her cloaca. "On this day, Ellie was deemed to be pregnant." See text for details. Image by the author.

Figure 5. 6 June 2015. The bobcat appears for round two. This was the author's first look at her on this day. She was perched on a boulder above him, and the incoming signal clearly indicated that she was dangerously close to Ellie. The cat made it clear that she was opposed to the author finishing the job of tracking Ellie. Image by the author.

plump, and the point where the cloaca begins and the body ends, the plumpness ended abruptly. On this day, Ellie was deemed to be pregnant.

There were several other tracking events to occur between May and early June that year. While each was thrilling in its own way, on 6 June, things got heated again. (And we speak of more than the weather here). I arrived at Iron Mine Hill at 0530 hours. (Goodness gracious—I was tough back then!). The opening temperature was 18.5°C, the cloud cover was 35%, and the humidity was an astounding 61%. An early-morning rainbow arched across the western sky, greatly accentuated by the rising sun. The rippling landscape seemed to stretch into infinity under the multi-hued arch, and seemed to be fresh and scrubbed clean by the half-inch of rain that had fallen the night before. Precipitation in early June is highly unusual, but not nearly as unusual as this day was about to become. The customary mass signaling occurred upon my arrival, and it was ascertained that Ellie was going to be the first snake to be tracked this morning. (Whenever any snakes were deemed pregnant—especially Tiger Rattlesnakes—they got our utmost attention. They tend to give birth much earlier than their other crotaline cousins. Tigers give birth from mid-June through July, while *atrox* and *molossus* do so in from August through mid-September. Ellie could drop at any time now, and we didn't want to miss it). Ellie's signal was dialed in, the blips told me she was still very close to the vicinity of her map of Indiana location nearly a month previous. There is a rugged jeep trail that leads to the top south portion of Iron Mine Hill, and I hiked briskly up that road until the signal, and surrounding terrain, told me to veer off. I strolled past the Indiana rock, and continued upward. The signal was leading me up a chute of sorts. Said chute was a mini-slot canyon, lined on my left by massive, barn-sized gneiss boulders, and to my right, some more subtle and scattered formations that suggested the chute was my easiest route up. Roughly 30 meters past Indiana, the signal indicated that I was within spitting distance of Ellie. She was perhaps three short paces upslope from me, tucked somewhere inside those massive gneiss boulders to my left. I dialed the volume of the blips down to a bare whisper, and was poised to start slowly advancing upward to its source. It was at that point that I looked up the chute, and perched atop a large boulder, perhaps 10 meters upslope, was that darn bobcat again!

And my, *how* she had grown! Indeed, she looked so large that I convinced myself for several days that the cat I was staring at today was perhaps the boyfriend of the first one. But in the end, a local cat expert and I did some careful facial comparisons on the photos that were taken, and found they were a perfect match. And even if she had undergone a total makeover and facelift, her attitude was enough of a one-in-a-million phenomenon to sell me on the fact that this was the same cat.

How long she had been watching me is a mystery. I just know that a chance glance upward revealed her gazing downward at me. The rising sun to the east backlit the left side of her face, and there was a halo-like glow emanating around her head. I was standing in deep shade, and her posture on the ridgeline was accentuated by a baptism of fire. The photo opportunity was actually excellent, but as Figure 5 demonstrates, her head was partially obliterated by the limbs of a Buckhorn Cholla, a sprig or two of Limber Bush, and some smaller, twig-like branches of a Palo Verde Tree. The resolution of the LCD screen on my camera is horrible. Even if I was smart enough to figure out how to bring that face into full focus through the vegetation, I would not be able to see the image well enough to get it right. On my best day, I am not very steady in the hands, and on this day, I was visibly shaking from the stress of being downslope of a large kitty. Before the photography started, and throughout the process, I played a little game of cat and Rog with her. I have at times had success with house cats by staring into their eyes, squinting, and opening them wide again. Some of the house cats that I have done this with mimic these antics. The bobcat responded to this eye game by also squinting and opening her eyes wide in response. As I began to snap images of her, I continued the game by lowering the camera and raising it again while doing the squint and wide open eyes thing. And my images clearly show that she seemed to be playing along. Perhaps it was all coincidental, but I obviously think that cat was enjoying—or at least participating in—our little game.

Meanwhile, while playing mind games with a being that was at least twice as smart as I am, there was a Tiger Rattlesnake less than two meters in front of me. The signal told me that Ellie was close, and my past experience with this particular boulder formation had taught me that three other tigers had used this exact spot in years previous. I seriously was considering continuing

Figure 6. 6 June 2015. The author backs off, and the cat moves downslope. This image is an overview of the chute, the bobcat (directly below the white Y), and Ellie's presumed parturition site (marked by the black X). Below the X is a cavernous, east-facing and deep-running soil burrow. It is assumed from the actions of the bobcat that her litter was occupying this X-burrow on the day of this image. Ellie was also in that X-burrow. See Figure 9. Image by the author.

the tracking exercise, until I took one step upward to do so. That was all that it took to change that cat's mood. One little step, and that feline demon cranked out that unearthly growl of hers. It was the exact sound that she had made nearly a month before: "G-r-r-r-r-**R-R-R-R—**me-e-e-e-e-e-**OWL**-l-l-l-l-l-l-l!" (Only longer in duration, and with a *lot* more sustain to it.) I stepped backward, and she stopped. I stepped forward again, and she cranked it up again. This happened at least three more times, and she clearly indicated that she was *not* going to quietly tolerate my getting any closer. That one step was not going to be allowed. I already knew what Ellie's site was going to look like. It is a rather cavernous, deep-running and east-facing opening with a soil bottom, with numerous tight crevices in the formation above and around it. It is a perfect place for a Tiger Rattlesnake to give birth. It is also a perfect place for a mother bobcat to stash her kittens while she goes off on a nocturnal hunt. It is also the perfect place for a transmitter to be buried in a pile of cat scat. In her fattened condition, Ellie would have been a fine snack—for young and old kitties alike. After much inner angst, it was decided that discretion was the better part of valor. I backed off. Rather than matching me stride for stride, she waited for me to get about five meters downslope. She then moved forward five meters. I backed off another five—walking backwards, and she moved to her "last stand" position. It was less than two meters east of the opening that I am guessing Ellie, or merely her transmitter, occupied. (Figures 6 and 7). I'll never forget the sight of her briskly coming down that slope. As suggested earlier, she had grown during that one month interlude. She was a very hefty, healthy-looking bobcat. *If* she was 35 pounds the first time I saw her, she had to be over 50 pounds at this point. This weight estimate conflicts by nearly double with most of what I've read, although an adult female from Maine did weigh in at 76 pounds. Whatever her size was, she was big and bad enough to send me slowly whimpering my way downslope. I had parked my truck close to the bottom of the road that led to the top of Iron Mine Hill. It was there that I did my write-up of the incident. The timing of it all as written on the data sheet exactly matched the time stamps on my camera. A total of four minutes had elapsed from the first to last image. It seemed like an eternity!

Figure 7. 6 June 2015. The author's last look at the bobcat, which when the image was taken was seated within two meters of the source of Ellie's signal. Image by the author.

I decided to do the remainder of my tracking this day on the opposite side of the hill. In all, 4 *Crotalus molossus* were radio-tracked. The tracking and ensuing write ups all took longer than normal. This was because I was constantly looking over my shoulder throughout the morning. I fully expected to see that cat stalking me. I felt particularly vulnerable as I filled out the data sheets. Such angst was for naught, as I never saw this or any other bobcat on our hill to this very day. Thank God and Greyhound, she is gone. I have included Figure 8 in this article, as somehow through this nerve-wracking morning, I managed to take my best ever image of Cm10, also known as "Susan." I have yet to write anything about Susan in these columns, but she was a magnificent animal to track, and quite the performer. She taught us much about *molossus*, and in the event that I never write about her, this is as fine a look at this sweet, sweet snake that any of us will ever have. Perhaps I accidentally dialed in a correct setting on my camera? In any case, I'm not sure what I was aiming at, or how it happened, but the photo is good!

There was still some unfinished business remaining with the sudden presence of this bobcat throwing a monkey wrench into the middle of Ellie's pregnancy. Said unfinished business revolved around a simple question: Was Ellie alive, or dead? A tracking session that occurred exactly one week later, on 13 June,

Figure 8. Still 6 June 2015. One of the better images taken of female *Crotalus molossus* #10, "Susan." As mention of this fabulous snake has never been made in these columns, the author deemed it time to at least slip an image of her in. Susan was found on the opposite side of Iron Mine Hill-as far away from that Bobcat as the author could get! Image by the author.

Figure 9. SHE'S ALIVE! And still obviously pregnant! Ellie as she appeared in the X-burrow on 20 June 2015, two weeks after the second Bobcat event. From 6 June to 20 June 2015, the author feared the Bobcat or her cubs had devoured her. Ellie eventually gave birth at the place where this image was taken-which was probably the same location as mamma Bobcat had hidden her kittens. Image by the author.

resulted in Marty Feldner *not* getting a visual on her. (The two of us were often switching tracking duties at this point in time). She was still in the same location two meters west of where that bobcat made her last stand. By now I was thinking highly negative thoughts. These thoughts were put to rest when I saw and photographed Ellie on 20 June (Figure 9). She was still in the presumed residence of the bobcat sighted on 6 June. My notes on her for this evening say "Hugely prego." (pregnant). I again saw her there on 27 June. Once again, she was noted as being pregnant. She was still at this site on 11 July, but not visible again. Finally, on 12 July, Marty saw her out again at the same location. His notes indicate: "Ct12 is very thin, has dropped babies." All we learned about Ellie's birthing experience in 2015 is that she dropped at some point between 27 June and 12 July. There were no observations of neonates, and not a single neonate shed skin to confirm our suspicions.

I am using a quick head count to determine that we had a total of seven wild parturition events occur with tigers under our watch. The exact number is in our binders, waiting to be mined. Seven is close enough for what comes next. Out of these seven incidents, we found one neonate shed skin, and saw one living neonate tiger. We eventually took a lesson out of the master tiger-tracker Matt Goode's playbook, and starting bringing them back with us as soon as they were deemed pregnant. We did this three times, the results of which have yet to be published anywhere except the new *Rattlesnakes of Arizona* book. (Said

Figure 10. Even though the radio-telemetry aspect of the Suizo Mountain Study was deemed finished in January of 2016, since that time, three of the formerly transmittered Tiger Rattlesnakes have continued to show fidelity to their overwintering locations. This image, taken by Marty Feldner on 21 October 2018, shows either Ellie or *Crotalus tigris* #13, "Katey," peeking out of their communal overwintering site. The two females have denned together for three fall/winter seasons in a row.

results will be coming to a column near you soon). In 2015, we left Ellie to proceed with a wild birthing event, knowing this was going to be our last chance to see something in a natural setting. It didn't happen! This was mostly because we didn't try hard enough, but also serves as an indication of how subtle their birthing process is. When dealing with Tiger Rattlesnakes, we are working with a small species of rattlesnake that makes its living amongst boulders great and small. There is likely nobody in the world who tried harder to record reproductive behavior of this secretive species of rattlesnake than Matt Goode's team and ours. We flat out failed. If you want more—do it yourself! In any case, it is interesting to note that Ellie *and* her young went through the ordeal in the shadows of several dangerous and hungry predators. She *had* to be aware that cat and kittens were there, or she would not have survived. The big question is: Did the cats know *she* was there? They must *not* have known—or they would have gotten her!

The bobcat aspect of this story may be over, but where Ellie is concerned, there *is* more to relay. On 16 January of 2016, her transmitter was the very last functional transmitter of the Suizo Mountain Study. A gang of four of us tracked her down, and wrote her up. The four people were John Slone, Marty Feldner, Dale DeNardo, and me. It is fitting that those who carried the study forward to its very last day were all together for the last tracking episode. At the top of page 100, in the very last three ringer binder that will ever be created about this study appear the words "End of study." But those words are not quite true. The fact is that at the date of this writing, which is 3 January 2019, Marty and I know *exactly* where Ellie is. See Figure 10 and caption. The site fidelity displayed by three of our tigers will assure that we have a strong chance to continue to see Steven (Ct11), Ellie (Ct12), and Katey (Ct13) for as long as they are alive. While we no longer radio-track on Iron Mine Hill, it may very well be that the best is *still* yet to come.

This here is Roger Repp, signing off from Southern Arizona, where the turtles are strong, the snakes are handsome, and the lizards are all above average.

Minutes of the CHS Board Meeting, December 14, 2018

Rich Crowley called the meeting to order at 7:37 P.M. Board members Dan Bavirsha, Lawrence Huddleston, Kim Klisiak and Jessica Wadleigh were absent. Minutes of the November 16 board meeting were read and accepted with changes.

Officers' Reports

Treasurer: John Archer presented the financial reports for November.

Membership secretary: Mike Dloogatch read the list of expiring memberships.

Media secretary: Kim Klisiak has reported that the revamped ReptileFest site is nearly complete.

Sergeant-at-arms: Mike Scott reported 37 in attendance at the November 28 general meeting.

Committee Reports

Shows: Gail Oomens reported that Chauncey would like us to attend the Chicagoland Fishing, Travel & Outdoor Expo at the Schaumburg Convention Center, January 24–27, but with no touching or handling of reptiles. All in cages.

ReptileFest: Frank Sladek is still soliciting feedback on last year's show. A link to Eventbrite will be on the new ReptileFest page. Andy Sagan has agreed to host the ReptileFest planning committee meeting.

Junior Herpers: There were 24 people at the December meeting, at which Lalainya Goldsberry spoke on brumation.

Library: The library has received a copy of Mark O'Shea's new book, *The Book of Snakes: A Life-size Guide to Six Hundred Species from around the World.*

Grants: The deadline to apply for a 2019 CHS grant is December 31, 2018. The committee chair will once again be Robert Jadin, with members John Archer, Mike Dloogatch, Linda Malawy, Sarah Orlofske and Jessica Wadleigh.

New Business

John Archer suggested that we might want to open an account with CafePress, an online gift shop that can put our logo on items. Among other benefits such items could serve as thank-you gifts to our speakers.

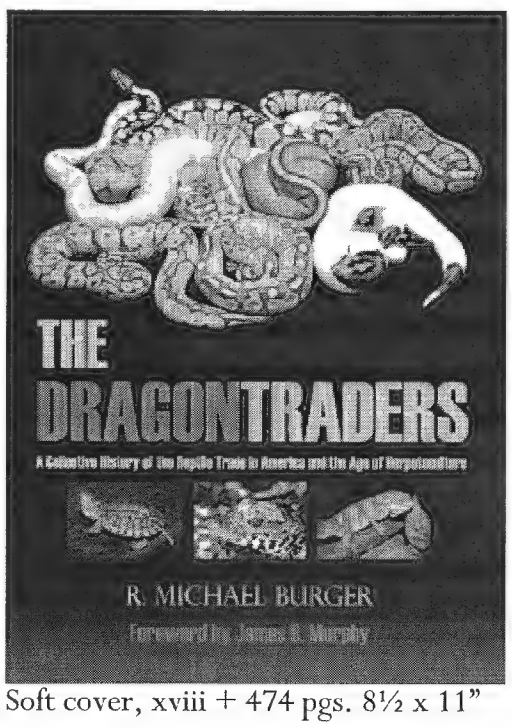
The meeting adjourned at 9:42 P.M.

Respectfully submitted by recording secretary Gail Oomens

NEW BOOK

The Dragon Traders

A Collective History of the Reptile Trade in America and the Age of Herpetoculture



R. MICHAEL BURGER

Foreword by James B. Murphy

The first comprehensive review of the people, places, trends, and events that influenced the rise in popularity of reptiles as pets, zoological displays, and in the American show trade. Ross Allen, Bill Haast, Frank "Bring 'Em Back Alive" Buck, Raymond Ditmars, Carl Kauffeld, Roger Conant, Marlin Perkins, Grace Wiley, Black Hills Reptile Gardens, Martin's Aquarium and many others are highlighted in this nearly 500-page book with over 300 color photographs, 174 b & w photographs, and 351 other illustrations by Bill Love, Troy Hibbitts, Casey Lazik, Louis Porras, Dave Barker, John Tashjian, Manny Rubio, and more.

"Wow! What a great book! What a tremendous amount of work! Looking through the book I think that all that it contains and encompasses is very impressive. It's a major work."
DAVE BARKER, author of *Pythons of the World Vol. I, II &III*

"Quite simply, I can't stop reading it, its great stuff. A lot I'm familiar with, but there are stories and people here that I had never heard of before, which makes it even better."
GRANT ANKENMAN, Metro Toronto Zoo, *retired*

"I thoroughly enjoyed reading the manuscript. It brought back times when I was a "young eagle" (as Gordon Johnston would say)."
WILLIAM H. GEHRMANN. Professor Emeritus

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In Memoriam

Near the end of 2018, the reptile community came together to celebrate the life of a dear friend, who left us too soon. Gathered at the celebration, nearly 300 people signed the guestbook in a very cramped bar and restaurant in Sycamore, Illinois. There were certainly more there who didn't sign, and countless others who wished they could attend. Pictures were found on every table, free tequila shots on another, videos playing overhead of his antics, and a beautiful cake decorated to look like his favorite species, *Spilotes pullatus mexicanus*, or the Mexican tiger rat snake. I stumbled across one of our mutual friends, an instructor at NIU from our Tropical Herpetology class in Costa Rica, who humbly said to me, "I don't think I've spoken to this many people in my entire life." It was a party, exactly as he would have wanted.

Because you see, Gavin Brink hated funerals. He spoke about it adamantly whenever it came up. He hated the sad atmosphere, where he believed someone's life should be celebrated. His family lovingly provided him with that celebration.

But he did love parties. Gavin was incredibly well known within the reptile community, partially because of his ability to bring people together. He would host annual "That's Texas" parties, which involved tongue-in-cheek Texas-themed events, not limited to boxing over a Texas flag painted on the lawn, slip-n-slides, tequila fountains, and even a rented mechanical bull. He would often be the center of attention at the semi-annual NARBC Tinley shows, sometimes having a room in the hotel where people would gather as he made his classic "Prison Sentence" beverage, a horrible concoction of tequila, 90% grain alcohol infused with the hottest peppers he could find, MSG coated rims, and homeopathic pills made with trace amounts of *Bothrops* venom. But somehow, it was always the happening place. He would tell every table where to go at the show, and people from all walks of life would come. The more people the happier he was.

Perhaps it wasn't the parties that made him happy, but bringing people together. Despite his often eccentric gestures, he always succeeded in winning people's hearts as that strange but incredibly lovable brother figure. There are few others in the community with as far of a reach as he had. His connections extended anywhere that had anything to do with reptiles. With his zoological exploits, academia, the CHS, Costa Rica, his trolling-but-educational anonymous online presence as "Mace Montana" in countless Facebook groups, and the community of breeders of unique and otherwise unrecognized species of colubrids—no matter where you went in the reptile community, if you mentioned Gavin Brink or Mace Montana, someone would recognize the name.

He was a man of knowledge and learning as well. He would always try to educate, without ever patronizing anyone for their ignorance or misconceptions—particularly when it came to the topic of poisonous snakes (yes, poisonous), on which he did a talk for the CHS in 2015. He loved working with kids, even doing a Junior Herpers talk and teaching children how to safely hook non-venomous snakes. Animals were certainly *his* passion, but he also wanted to spread that passion with everyone that he could.

Costa Rica, on the other hand, was where his spirit truly came alive. He taught as an assistant instructor in the Tropical Herpetology course I attended two years in a row. A class that was inadvisable for him because of his health, but that he refused to miss out on anyway. He'd been there many years prior to when I had the chance to go with him, but those memories will always be dear to me. In the dark of primary rainforest, we belted out ridiculous songs, just to keep spirits up as our exhaustion took over from the difficult 9-mile hike through mud as deep as our thighs. At one point, one of my boots was caught in a cow track, the suction pulling the ill-fitted boot off my foot. Another student and I, who often brought up the rear of the hikes, found ourselves trapped in the mud attempting to free it. He returned, laughing and taking pictures of our muddy situation before helping us back out, insisting that we cannot allow the mud gods to take such a sacrifice. We found many herps that year and the year to follow, toasting the end to our long nights with Imperial and tequila. Truly, though, I feel that I was able to glimpse his true self, in a way that you can only see in the depths of the Costa Rican rainforest.

At the most recent That's Texas, he spoke to me at length. My partner and I hadn't been able to come in a few years because of the timing of obligations, so he expressed how happy he was that we came and in his words, "I don't care how many people show up, just that everyone who does has a good time." My memories of him are of the reptile community, of his mentorship and influence of my life in the world of reptiles. He would bring me to events and introduce me to as many people as he could. That's what Gavin did; he made connections and brought hundreds of people together. Now it's our job to make sure those connections never fade, and our memories of him and those we met through his influence keep him alive for generations to come.

Pura vida, Gavin Brink. —Jessica Wadleigh

His family has created the Gavin Brink Memorial Fund, to provide an annual scholarship for a student to go to Costa Rica and support of the CHS. Send donations to First Midwest Bank, 230 W. State St. Sycamore, IL 60178.

Chicago Herpetological Society
Income Statement: January 1 -- December 31, 2018

Income		Expense	
Membership dues	$ 10,850.80	Bulletin printing / mailing	12,540.80
ReptileFest	68,376.62	ReptileFest	43,427.80
Donations	3,877.00	Grants	9,250.00
Bulletin back issues	10.00	Rent (storage)	2,079.93
AmazonSmile	17.13	Membership related	129.62
Interest	44.74	Bank / PayPal / Square fees	173.02
Raffle	487.00	Junior Herpers	290.40
		Other CHS shows	948.20
		Liability insurance	5,765.00
		Equipment and supplies	188.35
		Dues, licenses and permits	739.16
		Postage	2,532.66
		Speaker reimbursement	3,350.53
		Library	111.74
		General meeting expenses	250.00
		Conference attendance	860.21
Total Income	$83,663.29	Total Expense	$82,637.42

Net Income $1,025.87

Chicago Herpetological Society
Balance Sheet: December 31, 2018

Assets	
Checking	$ 5,607.63
Money market	46,439.52
Petty cash--show fund	283.00
PayPal	1,324.16
Postage on deposit	55.28
Total Assets	**$53,709.59**
Liabilities	
Credit card	228.71
Total liabilities	**228.71**
Equity	
Retained earnings	52,455.01
Net income	1,025.87
Total equity	**$53,480.88**
Total liabilities & equity	**$53,709.59**

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NEW CHS MEMBERS THIS MONTH

Neil Balchan
Elijah Bieri
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Cecilia Boyd
Ying Chen
Andrew Collins
Dr. Angela Duke
Justin Elden
Lizzy Hucker
Michael Itgen
Erick Jaeschke
Matthew Kaunert
John Kauphusman
Ruth Marcec-Greaves
Sara McClelland
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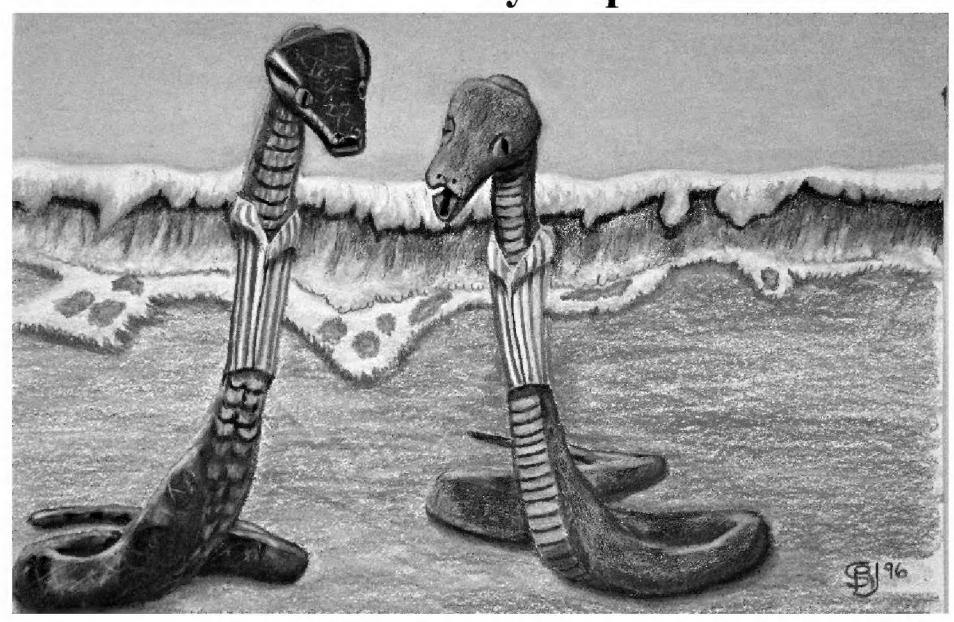

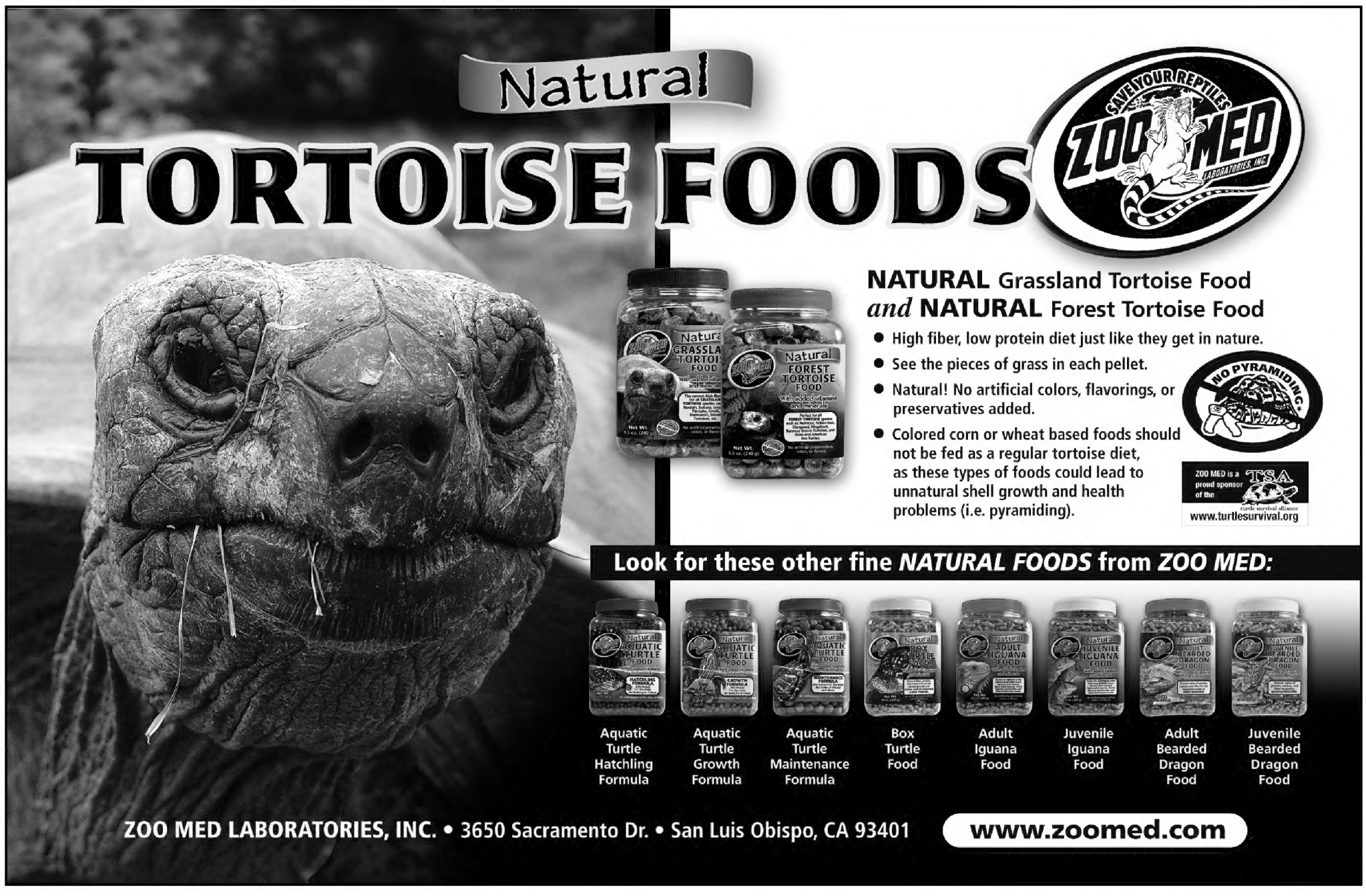
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UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, January 30, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. Our speaker will be **Daniel E. Keyler**, a professor of experimental and clinical pharmacology at the University of Minnesota. Dan will speak about "Snakebite Envenoming in Sri Lanka: Polyspecific Antivenom Development." Antivenoms currently distributed in Sri Lanka are prepared using venoms from non-indigenous species that are likely to differ from those of Sri Lankan snakes. In recent years Dan has used his immunotoxicology background in research toward the development of antivenom for treating snakebite victims in Sri Lanka where snakebite is a major public health problem. This has involved travel to Sri Lanka and collaboration with Costa Rica's Instituto Clodomiro Picado.

The speaker for the February 27 meeting has not yet been confirmed.

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum—the **Peggy Notebaert Nature Museum**. This beautiful building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

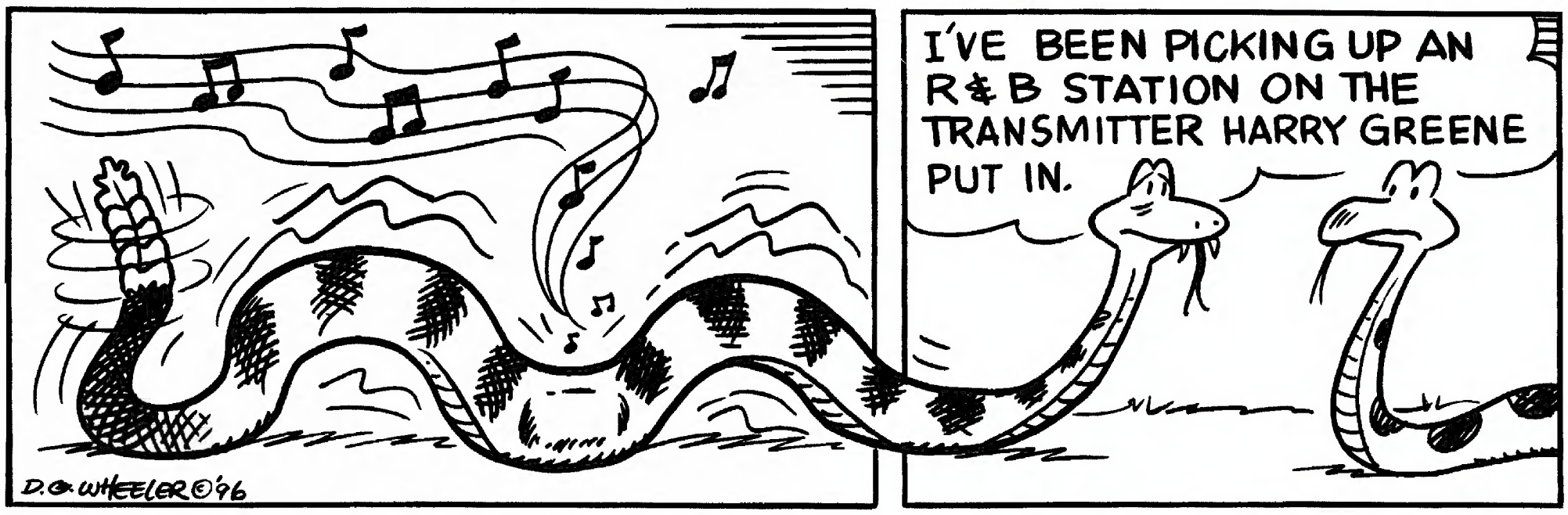
Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to take place on February 15, 2019. The venue is as yet uncertain, so if you wish to attend please email mdloogatch@chicagoherp.org.

The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the group's Facebook page.

THE ADVENTURES OF SPOT



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